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EDITORS AND PUBLISHERS:

H. A. PILSBRY, Curator of the Department of Mollusca, Academy of Natural Sciences,
PHILADELPHIA.

C. W. JOHNSON, Curator of the Boston Society of Natural History,
BOSTON.

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THE NAUTILUS.

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No. 1.

THE DIFFERENCES BETWEEN THE TWO NEW ENGLAND SPECIES OF ACMAEA.

BY HENRY JACKSON, JR.

During the summer of 1906, at North Haven, Penobscot Bay, Maine, I collected about fifteen specimens of *Acmaea testudinalis* (Müller) and thirty *Acmaea alveus* (Conrad), *alveus* being by far the more common. I put *A. alveus* here as a species rather than a variety of *A. testudinalis*, in accordance with one of the latest lists of New England mollusks which gives Conrad's species *alveus* specific rank. From this material I procured the radulas with the intention of studying the differences between the species *testudinalis* and *alveus*. The shell in *testudinalis* is a roundish and as a rule regular shell, there not being so much variation in form as in *alveus*. The shell of *alveus* is a narrower, laterally more compressed shell than that of *testudinalis*, and is found on eel grass, wharf piles and occasionally on rocks, but at North Haven it is most commonly found on eel grass which grows in great profusion, much to the disadvantage of boats and boatmen, all along the muddy shores. *A. testudinalis* is commonly found on flat stones between tide marks. The coloring of *testudinalis*, as far as observed at North Haven, has much less variation than that of the form *alveus*, which runs from nearly white to dark, blackish-brown, with many intermediate shades. This narrow, compressed form of *alveus*, it would seem, might have been caused by its being on eel grass which has narrow leaves and might cause a shell to be narrow by the lack of space to grow on. But Mr. Blaney has found *alveus* at Iron Bound Island, Frenchman's Bay, Maine,

on the under side of stones on a coarse, pebbly beach, and here it still retained its characteristic, long, narrow form. See Proceedings of Boston Society of National History, Vol. 32, No. 2, Nov., 1904.

All the illustrations here are of the same magnification. In the fifteen specimens of *Acmaea testudinalis* collected and studied the radulas were all the same with no observed variation, see Pl. II, Fig. 1. All had two central (C C), two lateral (L L), and two outermost teeth (U U), while among the thirty *A. alveus* were several abnormal radulas, in all of which abnormal cases there were three teeth in the center, Pl. II, Fig. 4, instead of two, Pl. II, Fig. 2, which is the normal number for *alveus*. The additional or third tooth (A), see Pl. II, Fig. 4, is on the left side and is a narrower tooth than the other two (C C). These abnormal radulas came from three very different individuals: one from a large, blackish, distorted shell, an adult, and one from a small, regular, white specimen of the nepionic age, and so on, all being different. There are several differences between the radulas of *testudinalis* and of *alveus*, and these differences were constant throughout the specimens examined.

FIG. 5.

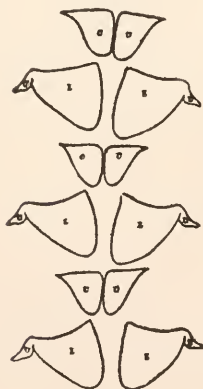


FIG. 6.



Fig. 5 (in text). *Acmaea testudinalis* (Müll). Normal adult radula. Developing teeth of the posterior portion of the same radula as Fig. 1. Lettering the same.

Fig. 6 (in text). Portion of anterior part of radula of *Acmaea testudinalis*, showing small bases (B), proximal portion of cusp (P C),

where the rest has been broken off, and plates (P) on lingual membrane (L M). U, outermost; L, lateral; C, central teeth. R, turned over part of plate. B, base.

There is a distinct dip in the proximal portion of the cusp of *testudinalis* in the laterals: this does not appear in *alveus*. In *testudinalis* the bases project from the proximal portion of the cusp at an obtuse angle, while in *alveus* the proximal portion of the cusp is the same size as the adjoining portion of the base. In *testudinalis*, Pl. II, Fig. 1, the apex of the cusp is just inside of the letter (L), from here it slopes down to the base; while in Pl. II, Fig. 2, *alveus*, the apex of the cusp runs the whole length of the foremost line bordering the shaded portion. In *testudinalis* the lateral teeth form a letter v, while in *alveus* they form an inverted v, thus \wedge . In *alveus* the laterals are less underneath the centrals than in *testudinalis*. The teeth of *testudinalis* are sharply rounded at the apex of the cusp, while those of *alveus* are nearly square, Pl. II, Fig. 2, and the younger, undeveloped teeth of the radula of an adult shell of *alveus* are perhaps the squarest of all, Pl. II, Fig. 4. This figure is of the developing teeth of the posterior portion of the same radula as Pl. II, Fig. 2. That is that portion hidden within the throat which will later come forward to take the place of worn-out teeth. I thought of the various causes of these differences, but it could not be individual variation, because the differences were constant throughout the forty-five specimens examined. It could not be because the teeth were worn square, as the squarest of them in *alveus* are in the early, developing part of the radula and before they had been used at all, see Pl. II, Fig. 3. There were five less important differences between the radulas of *testudinalis* and of *alveus*, these are: First the outermost tooth (U) is, in *alveus*, larger in proportion to the lateral tooth (L) than the outermost tooth of *testudinalis* is to its lateral tooth (L). In both species this little outside tooth (U) is nearly at right angles to the next tooth and the cusp of U faces in center of the lingual membrane (L), also it is very close to it, and at first glance appears to be the same tooth, only being a cusp of the larger denticle, but when viewed in a sideways, sectional view it is seen to be distinct. In the species *testudinalis* the tooth (U) cannot take much part in cutting food as it so much underlies the larger tooth (L), but in *alveus*, where it is more outstretched, it may do a good deal of work. Secondly, in *A. testudinalis* the cusps and bases alternate

large and small, see Pl. II, Fig. 1, that is, the base of the centrals (C C) being large and the cusps small; whereas in the laterals (L L) the bases are very small and the cusps large. The teeth in both species are set on separate plates, two on each plate. These plates are arranged in two rows, one down each side of the lingual membrane. The divisions between these separate plates are not distinct in the developing portion of the radula, but the plates seem to wrinkle with age, and in the center of the radula an elongated oval space is seen between the two. The first two or three rows of teeth in *A. testudinalis* are slightly blunter than those behind, but by no means so blunt as in *A. alveus*. What I mean by first teeth are those teeth in the anterior portion of the radula, these teeth are replaced by new ones which come forward from the developing portion.

Fig. 6, drawn by the author, showing plates and proximal portion of cusps in *A. testudinalis* where the rest is broken off.

Again the cusps of the teeth of *testudinalis* are very much more slanting backward or posteriorly than those of *alveus*, especially the laterals (L L). Lastly, the cusps of *testudinalis* are minutely granulated, while those of *alveus* are indistinctly striated. This was seen in some cusps broken off their bases, placed on a separate slide and viewed with a one-sixth inch objective.

In summing this matter up, one might say without much doubt that these two shells were distinct species. Also one may say that both radulas are exceedingly strange. They have no central tooth speaking strictly, as, with the exception of the abnormal radula of *A. alveus*, all radulas had an even number of teeth. Their deep chestnut color is another curious feature. Also they are very hard radulas to draw as they are raised more than most teeth and the angles and focuses are hard to get.

My thanks are due to Mr. R. T. Jackson, of Cambridge, and to Mr. J. A. Cushman, of the Boston Society of Natural History, for drawings of the radula.

EXPLANATION OF PLATE AND FIGURES.

Fig. 1. *Acmaea testudinalis* (Müll). Normal adult radula. L, lateral; C, central; U, outermost teeth. The cusps are shaded.

Fig. 2. *Acmaea alveus* (Conrad). Normal radula. Lettering the same as before. The outermost teeth (U) are so close to the laterals (l) that in this view they seem to be joined.

Fig. 3. *Acmaea alveus* (Conrad). Normal radula. Developing teeth of the posterior portion of the same radula as Fig. 2. These teeth have little or no coloring. Lettering the same.

Fig. 4. *Acmaea alveus* (Conrad). Abnormal radula. L, lateral; C, central; U, outermost; A, additional teeth.

PULMONATES OF THE MATINICUS ISLANDS, MAINE.

ARTHUR H. NORTON.

The Matinicus Islands form a group of off-shore islands outside of Penobscot Bay. They constitute the most isolated land mass of any size in the state, their nearest point of approach to the mainland being thirteen nautical miles. In the group there are eight islands, seven dry and numerous half-tide and sunken ledges. The total acreage I have roughly estimated at about fifteen hundred acres.

Matinicus is the largest of the group, containing about eight hundred acres. It is quite well wooded and diversified in topographical features. Exploration of this island would doubtless increase the following list materially.

Seal Island lies six miles east of Matinicus harbor, and Matinicus Rock five miles south of the harbor, both forming isolated points of great exposure and long separation.

Several plants are found in abundance on these two points which are nowhere else abundant on this coast west of Petit-Menan point. Both are destitute of trees. As would be expected from their long isolation and great exposure, they are completely "rock bound," in fact, enormous ledges, with their valleys and seams filled with soil, which is partly coarse gravel, deeply overlaid with decayed vegetation, and everywhere strewn with fragments of rock, rent by frost and the action of time, or hurled by the fury of unusually severe storms.

The southwestern exposures of both are bluffs dropping immediately into water of considerable depth. At the rock, the history of which has been made known through the medium of the light-house establishment, the surges generated by gales from the southeast not infrequently break over the island notwithstanding the fact that it is about fifty feet above mean high-water mark.

The character of the soil, and the copious moisture from dews and fogs are conducive to very rank growth of several species of maritime plants, affording suitable conditions for the mollusca enumerated.

During my visits to the islands, shell collecting has been entirely secondary. Yet the isolation of the islands lends so much interest to the collection that the following records do not seem entirely superfluous, especially as a thorough investigation is not practicable at present:

Helix hortensis Müller. In June, 1896, I found this species in great abundance on Seal Island. They inhabit the rank vegetation toward the western end. The yellow, unbanded phase predominated, only three or four banded ones being found. Some young specimens having but two and a half whorls were also found on the occasion of this visit. I have not found it on any other island of the group. It was recorded by Mr. C. W. Johnson from Seal Island in THE NAUTILUS for November, 1906, page 77.

Vallonia costata Müll. Rather abundant on Seal Island in 1896 among rank herbage and driftwood.

Pupilla muscorum Linn. Four specimens were found with the last-named species. They are but 3 millimeters long, half a millimeter shorter than specimens taken on the adjacent mainland. One is a rich brownish, the others opaque white, all edentulous.

Cochlicopa lubrica Müll. One specimen was found under a log, stranded high on Matinicus Rock, August, 1905.

Vitrina limpida Gould. Found rather plentiful among stranded chips and rank vegetation on Matinicus Rock, July, 1903.

Zonitoides arborea Say. Matinicus Rock. Three specimens under logs, stranded high above normal tide mark, August, 1905.

Agriolimax agrestis Linn. Several specimens were found under logs and stones or hidden by rank vegetation on Matinicus Rock, August, 1905.

Pyramidula alternata Say. A single dead and broken shell was found at the northern part of Matinicus Island, August, 1905.

Pyramidula striatella Anth. Common with the other small species on Seal Island, June, 1896.

Succinea obliqua totteniana Lea. One found on Matinicus Rock, July, 1903.

Succinea awara Say. Two obtained at Seal Island, June, 1896, and one very small one at Matinicus Rock, July, 1903.

A LIST OF LAND AND FRESH-WATER SHELLS OF YEMASSEE, SOUTH CAROLINA.

BY JOHN B. HENDERSON.

In the early part of March last I spent a week upon a plantation near Yemassee, Beaufort Co., South Carolina, the greater part of my time being spent in snail hunting. Beaufort is a low-lying county within the Atlantic coastal plain. Its features are of three distinct sorts: a sandy, dry-pine area, the "knolls" of live oak with rather dense deciduous vegetation, and the swamp lands. The swamps are extensive, often containing forests of cypress and rank growths of aquatic vegetation. In places these swamps are drained and converted into rice fields, the latter furnishing excellent stations for fresh-water mollusca. The pine lands harbor a scant molluscan fauna. The great majority of land shells are to be found only in and about the edges of the deciduous forests. In the depths of the swamps I found almost nothing, the fresh-water species seeming to prefer more open and smaller bodies of water—particularly the little ditches which drain the rice fields.

The prevailing *Polygyra* is *hopetonensis*, a typical costal plain species, as it ranges along the Atlantic border from Norfolk to St. Augustine. It obviously belongs to the *fallax-tridentata* series and I think is a descendant of the former, which, having migrated into the lowlands of the coast, has been modified by its new environment. The species has become well enough marked to separate it readily from the upland *fallax*. It admits, however, of several local races which may some day be christened with varietal names. The extreme forms are *hopetonensis obsoleta* Pils. of Newbern and Wilmington, N. Car., a large form entirely without teeth upon the outer lip, and a Yemassee race which is very small and with strongly developed denticles.

I was surprised to find *Euglandina truncata* an abundant species so far north. The Yemassee specimens are large, stout fellows of very brilliant pink, rather darker than typical Florida specimens.

The following is a complete list of my catch, though it cannot be faunally complete. The entire absence of *Amnicolids*, *Unionidæ*, *Viviparidæ* and of *Ancylus* is rather striking. I owe many thanks to Dr. Pilsbry for his critical identification of my shells:

Polygyra thyroides Say.

Polygyra hopetonensis Strebel.

Polygyra postelliana Bland.
Polygyra pustuloides Bland.
Euglandina truncata Gmel.
Circinaria concava Say.
Gastrodonta cerinoidea Anth.
Zonitoides arborea Say.
Zonitoides minuscula Binn.
Vitrea indentata Say.
Helicodiscus parallelus Say.
Eucomulus chersinus Say.
Bifidaria contracta Say.
Bifidaria procera Gld.
Succinea campestris unicolor Tryon.
Succinea aurea Lea.
Planorbis parvus Say.
Planorbis tumidus Pfr.
Physa cubensis Pfr.
Physa heterostropha Say.
Lymnaea columella Say.
Sphaerium partumeium Say.
Pisidium sp.

SOME NEW EOCENE FOSSILS FROM ALABAMA.

BY T. H. ALDRICH.

The shells described below are all in the cabinet of the writer, and are believed to be new. They are mostly small species or else very rare, and represented by very few or single specimens.

TEREBRATULINA BRUNDIDGENSIS n. sp. Pl. I, figs. 1, 2, 3.

Shell medium, narrower than high, radial threads very strong in the young shell becoming finer in the older, and in the oldest forms appearing as very fine lines only. A central, raised rib doubled shows on the ventral valve, replaced with a depression between two ribs on dorsal valve; foramen oblong. Longest diameter 14 mm., width 11 mm. Smallest form figured is $9\frac{1}{2}$ mm. and 7 mm.

Locality: Eocene of Brundidge, Ala.

Remarks: This species occurs in a stratum of white limestone which was exposed in a large well close to the R. R. station. This well was dug for water for a supply for the engines, but when the

limestone stratum was dug into it failed as a water tank. Associated with the species is *Terebratula wilmingtensis* L. & S., *Ostrea vomer* Morton and several other species which occur in the white limestone or Jackson horizons. The area surrounding the well is typical Nanafalia lignitic deposits. So far no other outcrop of this limestone has been observed in the vicinity, but careful search is yet to be made. This discovery was called to my attention by Dr. E. A. Smith, State Geologist of Alabama, who sent me a number of specimens. We subsequently visited the well together and went over the locality south of the town, failing to find an outcrop. Dr. Smith thinks his discovery is an "overlap" of the white limestone or Vicksburg, somewhat as in certain Georgia localities. All the different forms of *Terebratula wilmingtensis* mentioned and figured by Prof. Dall in Vol. 3 of Wagner Free Inst. of Science, p. 1537, pl. 58, figures 14-20, are found here.

TURBONILLA (STRIOTURBONILLA) HARRISI n. sp. Pl. 1, fig. 8.

Shell as figured, small, with approximately parallel sides. Whorls eight, the two apical ones smooth; spire obtuse; whorls longitudinally striated with numerous impressed lines; base of shell smooth; aperture ovate, pillar lip bearing one fold. Length 3 mm.

Locality: Wood's Bluff, Ala.

Remarks: This species is doubtless the same one mentioned by Prof. G. D. Harris in Bulletins of American Paleontology, No. 11, p. 96, pl. 12, fig. 10, 1899, as *Turbonilla* sp.(?), but he evidently had an immature shell. Named in honor of Prof. Harris.

TURBONILLA (CINGULINA) ANITA n. sp. Pl. 1, fig. 12.

Shell medium, spire obtuse, whorls nine, the two apical ones smooth, balance with about six spiral impressed lines; lines of growth very fine and rather close set, aperture ovate. Pillar lip twisted and slightly prolonged at base. Length 6 mm, breadth of body whorl $2\frac{1}{2}$ mm.

Locality: Wood's Bluff, Ala., and same horizon 6 miles east of Thomasville, Ala.

CERITHIOPSIS REGULAROIDES n. sp. Pl. 1, fig. 7.

Shell small, fragment from which this description is made with seven whorls; these have two raised spirals, which form nodules at the intersection with the longitudinal lines. The spirals are placed one above and the other below the centre of each whorl; longitudinals coarse and prominent; a smooth raised spiral encircles each

whorl below the suture. The base appears to be smooth, canal twisted. Length of fragment $7\frac{1}{2}$ mm., breadth of basal whorl $2\frac{1}{4}$ mm.

Locality: Wood's Bluff horizon six miles east of Thomasville, Ala.

Remarks: This species has a general resemblance to *Cerithiopsis fluviatilis* Ald., but differs in the position of the raised spirals.

MATHILDA ELONGATOIDES n. sp. Pl. 1, fig. 6.

Shell small, exceedingly narrow and elongated, whorls about fourteen, well rounded, carrying three nearly equidistant strong spirals on the main part of each whorl and also a slight one just below the suture. The longitudinals between the spirals are numerous and close set, and rather fine. Body-whorl at base shows several spirals in addition to those above mentioned. Aperture nearly circular. Apical whorls reversed. Length 6 mm., breadth of body-whorl 1 mm.

Locality: Wood's Bluff, Ala.

MATHILDA SINGULARIS n. sp. Pl. 1, fig. 11.

Shell small, whorls profusely ornamented; number of whorls five, besides the embryonic apex; apical whorls twisted and pointed horizontally or at right angles to the axis of the shell. The main whorls are angulated by a very strong peripheral line with a smaller one above, and from one to two still finer ones between. Body-whorl shows several (about four) fine spirals below the central one, extreme base nearly flat. Aperture ovate; pillar lip reflected, and slightly prolonged into a canal.

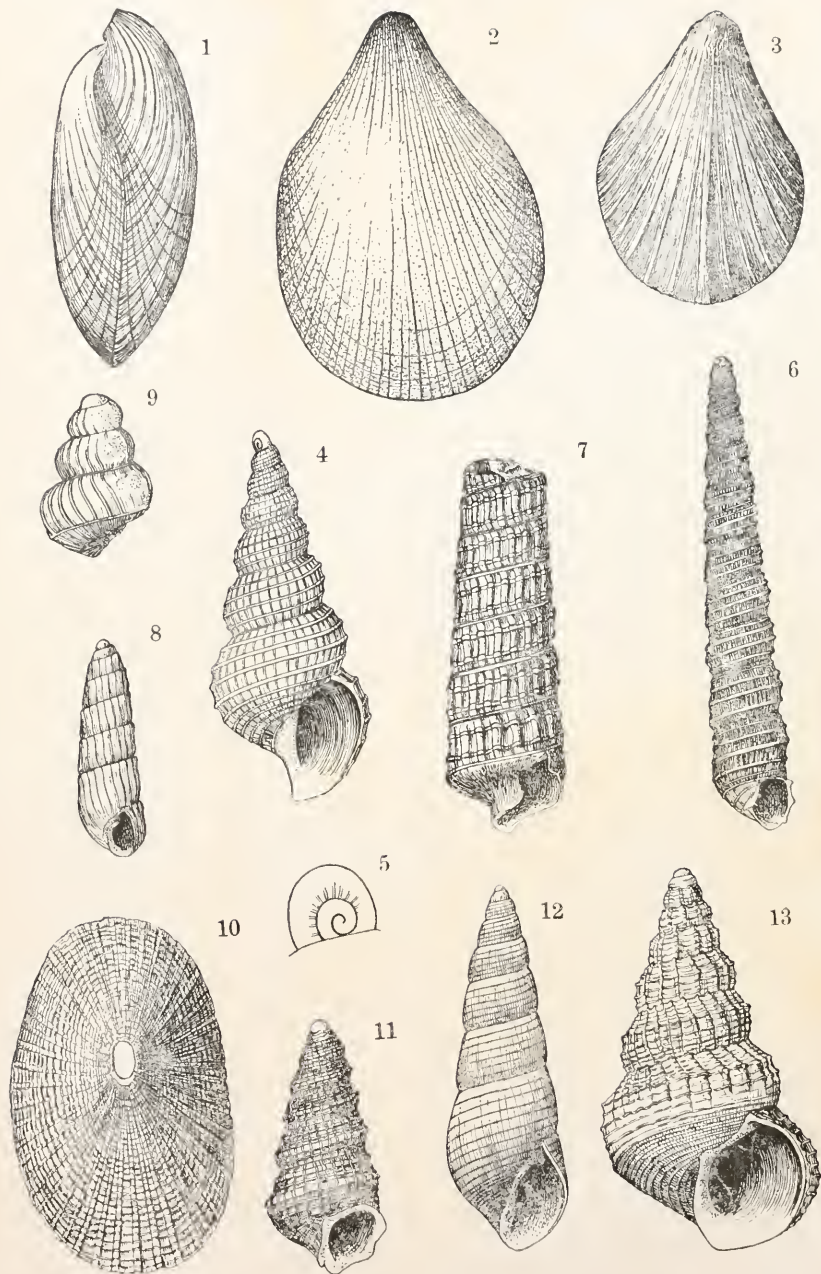
Locality: Wood's Bluff, Ala.

MATHILDA LEONA Aldrich. Pl. 1, figs. 4, 5.

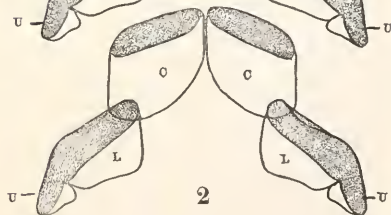
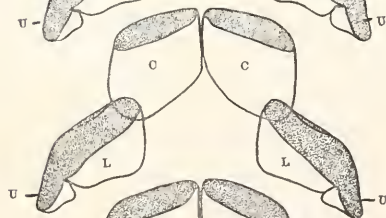
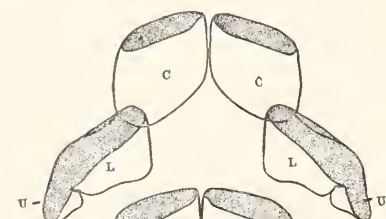
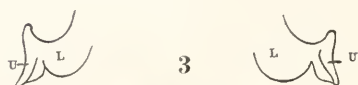
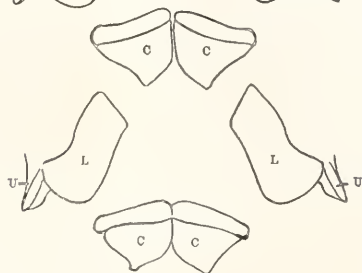
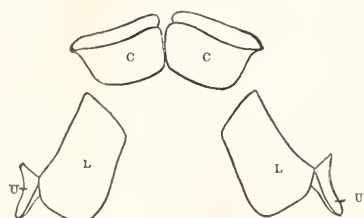
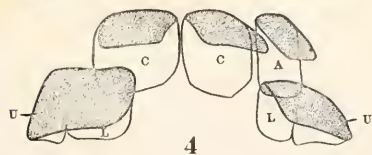
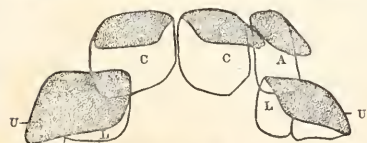
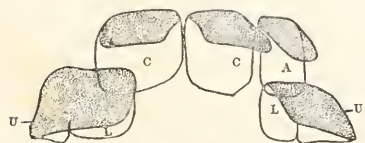
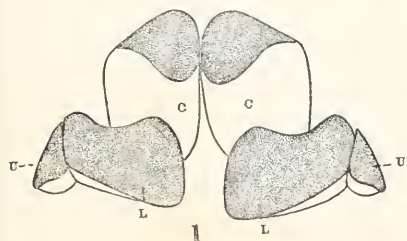
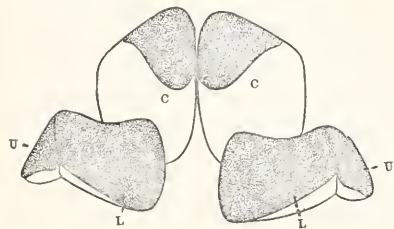
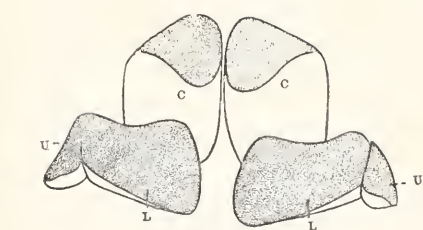
This species was described from the Wood's Bluff horizon. The present specimen is from the Matthew's Landing beds, one mile west of Oak Hill, Ala. The original description was drawn from a young shell, and in this example the embryonic whorls are twisted to the left and the spire projects horizontally. This specimen also shows a small umbilicus.

SCALA VETUSTA n. sp. Pl. 1, fig. 9.

Shell as figured, number of whorls unknown, but four showing in type; they are rapidly expanding and ornamented with about twenty raised ribs; suture defined with a strong carina which makes a raised and angulated boundary for the base; the ribs continue over this line, and disappear into a deep and wide umbilicus. The spiral lines do not show upon the base. The figure is natural size.



ALDRICH. NEW EOCENE FOSSILS.



Locality: Midway stage on McConnico plantation, Wilcox Co., Alabama.

Remarks: This specimen is quite imperfect, but the species is so well marked that it deserves a name. It is probably the same form mentioned by Prof. Harris in Bulletin of Am. Pal., No. 4, p. 232.

SCALA DOLOSA n. sp. Pl. 1, fig. 13.

Shell rather small, cancellated; whorls eight, the first two smooth, balance with spiral lines which are coarse near the middle of each whorl, these lines give each whorl an angulated profile. The spirals are nodular in part at the intersections with the longitudinals. The figured specimen shows a varix; aperture nearly circular, outer lip expanded and rounded, interior smooth. Umbilicus open, and carrying a groove. Base of shell carrying numerous spirals, but no nodes, the lines of growth being very fine. Length 7 mm., breadth 4 mm.

Locality: Near Grave Yard Hill, Wilcox Co., Ala. Midway Stage.

FISSURELLA UNILINEATUS n. sp. Pl. 1, fig. 10.

Shell small, rather thin, depressed conic, cancellated. The radial lines are equal and regularly spaced, while the longitudinals are bowed between the radials, giving to the surface a wavy appearance, no nodules at the intersections, the lines crossing regularly. Hole oval, with a complete oval callus inside. Longest diam. 13 mm., breadth about 7 mm., height 3 mm.

Locality: Wood's Bluff, Ala.

NOTES.

ASHMUNELLA. On page 134 of the last number, the second line from bottom should read *ASHMUNELLA RHYSSA HYPORHYSSA* Ckll., in place of "*Ashmunella rhyssa* (Ckll.)." Owing to my absence in Florida I had no opportunity to see the proofs of this article.

H. A. P.

THE ORIGIN OF THE LUNG IN AMPULLARIA.

BY W. K. BROOKS.¹

Through the courtesy of Dr. Alfred G. Mayer I was able to visit and partially explore the Everglades of Florida in March, 1906. As we pushed our way through the tall reeds and grasses that cover the

¹From the Report of the Department of Marine Biology, Tortugas, Florida. Extracted from the Fifth Year-Book of the Carnegie Institution of Washington, p. 109, 1907,

shallow water of the Everglades, we found great numbers of small eggs attached to the stems of the reeds and grasses above the surface of the water but close to it.

The eggs were arranged in vertical rows, and were enclosed in calcareous shells, resembling in these respects the eggs of terrestrial pulmonate gasteropods.

We also found in the water in great abundance the prosobranchiate gasteropod *Ampullaria*, and when some of the older eggs were opened they were found to contain young specimens of this genus.

The *Paludinidæ*, which are closely related to the *Ampullaridæ*, are aquatic, viviparous, and breathe by gills, and their structure indicates that they are true prosobranchs, descended from and closely related to the marine prosobranchs. *Ampullaria* has gills, is partly aquatic, and seems to be a true prosobranch, so far as its general structure is in question, but as it has a lung, and is able to breathe air and live out of the water, and as it also lays, in the air, eggs in calcareous shells, like those of the terrestrial pulmonates, the question whether it is primarily a pulmonate, with secondary resemblance to the prosobranchs or primarily a prosobranch with secondary resemblance to the pulmonates, suggests itself.

As the embryonic history of the breathing organs may be expected to throw light upon this question, a quantity of the eggs were collected and taken to the Marine Laboratory in the Dry Tortugas. There the eggs were opened, the embryos removed and sketched, and then hardened and preserved for embryological examination.

On my return to Baltimore I placed the material in the hands of Mr. B. McGlone, who has studied the development of the respiratory organs under my supervision, and has nearly completed his work, which will soon be ready for publication. He has shown that the lung of *Ampullaria* is a member of the series of gill-filaments, and that it must be regarded as a modified gill, homologous with a ctenidium, or with more than one. It is therefore an organ which has been secondarily acquired, and not derived from the lung of the terrestrial pulmonates.

Both lung and gills arise very early in the embryonic history of *Ampullaria*, and at about the same time. In a very young embryo, soon after the mantle makes its appearance, a ridge or thickening of the epithelium of the inner surface of the mantle indicates the region from which the gill-filaments, the lung and the osphradium are to arise. The osphradium is developed from one end of this ridge, the gill-filaments from the other, and between the two the ridge becomes infolded into the substance of the mantle to give rise to the lung, which may be regarded as a modified and invaginated gill-filament.

The similarity between the lung of the pulmonates and that of *Ampullaria* is therefore nothing more than a new illustration of a resemblance between organs that have been acquired independently under like physiological conditions.

THE NAUTILUS.

VOL. XXI.

JUNE, 1907.

No. 2.

A NEW POLYGYRA FROM NORTH CAROLINA (P. SOELNERI).

BY JOHN B. HENDERSON.

On a collecting trip to the coastal plain region of North Carolina last autumn, with Mr. Soelner, of Washington, the following undescribed *Polygyra* was found :

POLYGYRA SOELNERI n. sp. Plate III, figs. 1, 2.

Shell globosely depressed ; spire low conoid, periphery rounded ; perforate, the opening half covered by columellar lip. Surface very glossy, closely, deeply and evenly ribbed throughout except on first $1\frac{1}{2}$ whorls which are smooth. Whorls $5\frac{1}{2}$, regularly increasing, the last falling abruptly and shortly in front, having a pale spot at the deflection. Narrowly and deeply contracted behind the lip. Aperture oblique and irregularly crescentic. Lip reflexed with a flange-like internal thickening which is widest basally and terminates short of the columellar end of the lip. A rather long curved white parietal tooth stands upon a hardly-perceptible parietal film. Color mahogany, with a glossy satin-like sheen ; lip purplish outwardly, the inner flange buff. Alt. 7, greater diam. 11, lesser diam. $9\frac{1}{2}$ mm.

Habitat among cypress logs in a swampy region on the north shore of Lake Waccamaw, North Carolina.

This remarkably pretty little *Polygyra*, which is very distinct from any other known species, might be included in the section *Mesodon*, its nearest ally being *P. christyi*, from which, however, it differs in being larger, less depressed and umbilicated. I take pleasure in naming the species after Mr. Soelner, my enthusiastic companion in the field when it was first found.

NOTES ON GUNDLACHIA. I.

BY BRYANT WALKER.

The validity of the genus *Gundlachia* Pfr. is one of the disputed points in systematic conchology.

The article by Hedley, reprinted with notes by Dr. Pilsbry in the NAUTILUS in 1895 (Vol. IX, p. 61), gives a very complete summary of the data down to that date. The only omission in regard to the North American forms that I have found, being the citation of *G. ancyliiformis* Pfr. from Palma Sola, Manatee Co., Fla., by Simpson in 1888 (Con. Ex., II, p. 96).

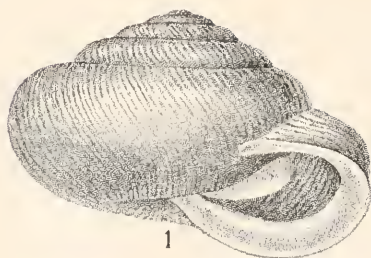
So far as I have been able to ascertain, no additional data in regard to our species have been published.

In the NAUTILUS for January, 1904, Dr. Dall called attention to a very interesting account by Nordinskiöld of a septa-forming *Ancylys* from South America and expressed the opinion that the so-called *Gundlachia* are merely *Ancyli*, which under favorable conditions are able to protect themselves from drought and cold by forming an epiphragm and subsequently "to secrete an enlarged and somewhat discrepant shell."

The occurrence with typical *Gundlachia* of non-septate individuals indistinguishable in shell characteristics from *Ancylys* has been noted by several writers. Hedley, who believes the genus a valid one by reason of anatomical differences, apparently inclines to the view that "in unfavorable circumstances a septum is never formed." While Dr. Pilsbry (NAUT., IV, p. 48), speaking of this apparent co-existence of two forms, remarks, that if correct, "*Gundlachia* will furnish the most extraordinary case of dimorphism known among our American mollusks."

During the last few years I have had occasion to examine critically large numbers of our Eastern American *Ancyli*, and until within the last year, with the exception of a small series collected by Ferriss near Joliet (to be discussed later), I have discovered no tendency whatever to septa-forming in any instance.

Recently, however, material from Ohio, Indiana, Alabama and Mississippi has been received, which is of considerable interest as bearing on the question, and the evidence thus afforded is herewith submitted for consideration.



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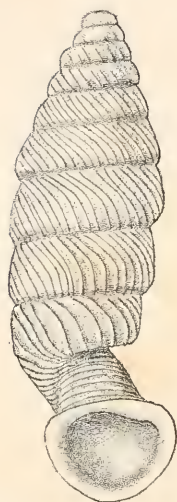
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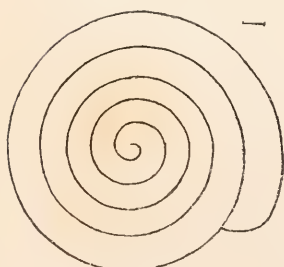
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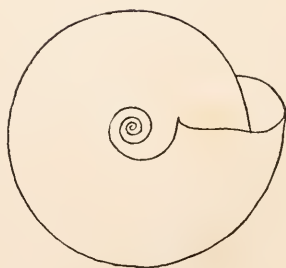
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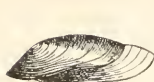


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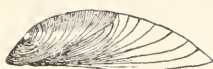


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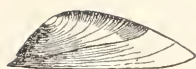
HENDERSON: POLYGYRA SOELNERI.
PILSBRY: MEXICAN LAND SHELLS.



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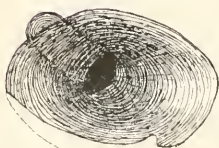
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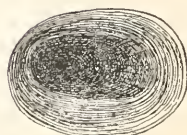
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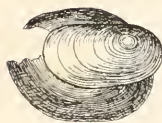
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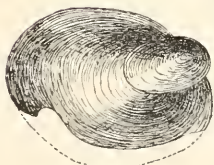
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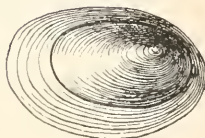
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11



12

The examination of this material leads necessarily to a study of the described forms of North American *Gundlachia*, and the results of this work may properly precede the consideration of the new material referred to.

I.

Gundlachia stimpsoniana Smith. Plate IV.

This species was described in 1870 (Ann. N. Y. Lyc. N. H., IX, p. 399, fig. 6) from specimens collected in ponds at Greensport, Long Island, N. Y., and on Shelter Island. Only the "primary" stage was figured. It has not been found elsewhere, so far as I know.

Through the kindness of Mr. J. B. Henderson, Jr., I have been able to examine the original lot of this species from the Smith collection. It consists of 71 specimens from Greensport and 1 from Shelter Island.

The Shelter Island example is a young shell that has completed the septum and is similar to the one figured (figs. 10-12). The Greensport set may be divided into four groups:

1. 60 examples of the primary stage, with the septum in all stages of development, from the first beginnings at the posterior margin to the completed septum. With one exception, these specimens, although varying somewhat in size and shape, are similar in all other respects. The matured, or rather, perfected examples, vary from $1\frac{1}{2}$ to 2 mm. in length, $\frac{3}{4}$ to 1 in width and from $\frac{1}{2}$ to $\frac{3}{4}$ in height. The shape is an elongated oval, the ends bluntly rounded, the anterior extremity being usually somewhat more expanded. The sides are nearly parallel, usually somewhat constricted in the centre, and rather more so on the right than on the left, but in the smaller specimens are occasionally slightly convex. The apex is blunt, slightly projecting and inclined to the right. It is radiately striate as in *Ferrissia*. The anterior surface is distinctly ribbed with fine radiating ribs, which, however, do not extend to the apex. The septum for the posterior half or two-thirds is either flat or, more usually, slightly convex. From about the centre of the shell it is flattened and descends slightly to the aperture. This depression is, no doubt, caused by the body of the animal in moving in and out of the constantly decreasing aperture. The lines of growth are curved and delicate, but quite distinct. On completion of its growth the edge of the septum is abruptly turned upwards to the level of the edge of the shell, and the whole margin of the aperture thus formed is slightly

thickened and becomes continuous as shown in figure 11. The exceptional specimen noted above is noticeably larger, but proportionately more depressed than the other, measuring $2\frac{1}{2} \times 1\frac{1}{4} \times \frac{1}{2}$ mm. But in sculpture it is precisely the same, and I have no doubt that it belongs to the same species. In this, the septum is but partially developed. A very similar specimen in size and appearance, but without any appearance of a septum, is noted under group 2. Nearly all of these specimens are "amber-colored," as stated by Smith, but this is caused by a slight ferri-oxide deposit on the surface, which disappears on the application of oxalic acid, and leaves the whole shell of a clear, transparent, corneous color.

2. Five examples of the primitive stage with no trace of septum. Evidently that growth had not yet begun. Four of them are of the usual size and shape of the "primary" shell. The fifth is somewhat larger and, barring the lack of septum, almost a duplicate of the aberrant individual noted in group 1.

3. Three examples in which the secondary growth had been made without forming a septum. In all of them the primary stage is sharply defined by the difference of color, and in color and shape agrees substantially with the usual appearance at that period. In one of them (figs. 3, 6, 9) the posterior slope is not continuous externally, there being a well-marked "break" between the two stages of growth, and internally the secondary growth flares out at a decided angle all around the posterior margin of the primary shell.

In the other two examples, the primary shell is rather more contracted laterally than usual, but the secondary growth is, on all sides, in a substantially direct continuation of the primary shell. It becomes more or less irregular, however, as it progresses and the general effect of the entire shell is that of abnormal growth. None of these shells, however, are referable to any of the described species of *Ancylus*. Smith states that the Greensport *Gundlachia* were associated with *Ancylus fuscus* and with "more elevated specimens, probably belonging to another species." If his identification of *A. fuscus* was correct, the difference in the apical sculpture, to say nothing of the general contour of the shell, forbid the union of the two forms. What his other species were, must remain uncertain until his specimens can be examined. Possibly they were non-septate examples of "*stimpsoniana*," in which the line of demarcation between the primary and secondary growths was not so distinctly indicated as in these specimens, which he included with his *Gundlachia*.

4. Three examples having both a septum and a more or less complete secondary growth. Smith states that of about one hundred examples collected in the course of three years, only two were fully mature. Of the specimens now in the collection, only one is apparently mature, and that is much smaller than the dimensions given by Smith for the fully mature shell, *i. e.*, $5\frac{1}{4} \times 3\frac{1}{4} \times 1\frac{1}{2}$ mm. As shown by the figures (figs. 2, 5 and 8), it is somewhat defective along the left margin. Allowing for the broken edge it measures $3\frac{3}{4} \times 2\frac{1}{2} \times 1$ mm. In shape, however, it agrees substantially with Smith's description, and in the absence of a better, may be considered as typical.

The second specimen, if ever mature, has had the secondary growth broken back on all sides nearly to the primary shell, so that it is quite impossible to say what the original size or shape was.

The third example is apparently the one referred to by Smith (p. 400) as having begun the secondary growth with a septum covering "less than a quarter of the aperture." As shown by the figures (figs. 1, 4 and 7), it has been broken along the posterior margin, but enough remains to give a good idea of its original appearance. It measures $2.75 \times 2 \times \frac{3}{4}$ mm. If this is the specimen mentioned by Smith, and is "about two thirds" grown, the shell represented by figs. 2, 5 and 8 is not far from being fully matured. The shape of this specimen is quite different from that of the "typical" shell, owing probably to the difference in the size of the septum. The resemblance in outline between it and the non-septate specimen figured is quite strong, as shown by figures 4 and 6.

This species is apparently quite distinct from both *G. meekiana* and *G. californica*, being characterized by its larger and more widely-expanded secondary growth. More material showing the mature form is very desirable, and it is to be hoped that collectors resident on Long Island will make its rediscovery a matter of special consideration.

MOLLUSCAN FAUNA OF MONTEREY BAY, CALIFORNIA.

BY S. S. BERRY.

During the summer of 1906, the writer attended a six weeks' session of the Marine Biological Laboratory of Stanford University, at Pacific Grove, California. While there considerable attention was

given to molluscan life in particular and an extremely interesting collection was made of the different forms. 394 species were obtained, a practically complete list of which follows. In addition to the mollusks, four species of brachiopods were collected.

The major part of the collecting was done along the shore about Pacific Grove, especially at what is locally known as the "Third Beach," and an interesting expanse of rocks called the "Big Tide Pool." In addition to this, a number of dredging excursions were undertaken with the aid of a gasoline launch, which resulted very successfully. Most of the dredging was done in quite shallow water, although one trip was made to a point off Moss Landing near the middle of the bay. On this occasion we twice pulled up the dredge filled to the brim with living echinoderms of the genus *Echinarachnius*, the common "sand-dollar," some two bushels in all. All of the mollusca collected on such occasions were given over to the writer, and his sincere thanks are due to Professor George Clinton Price, in charge of the laboratory, to Mr. Frank A. Woodworth, of Pacific Grove, and to many of his fellow-students for much valuable aid in the way of numerous specimens, pertinent suggestions and help of every description in the preparation of this paper.

The writer is also greatly indebted to Dr. William H. Dall and Mr. Paul Bartch, of the United States National Museum, who kindly determined all doubtful material and who have now in hand the description of the many new or undescribed species found. The new species are marked with an asterisk.

BRACHIOPODA.

Glottidia albida Hinds. Several living specimens were obtained at from twelve to forty fathoms' depth.

Terebratulina caput-serpentis Linné. A few very young specimens, presumably of this species, were dredged. Adult specimens are occasionally brought in from deeper water by the fishermen, usually attached to coral. They are of the form which used to be known as var. *unguicula* Carpenter.

Terebratulina transversa Dall. A few poor specimens were dredged at various depths, adhering to fragments of hard blue clay, shells, etc.

Laqueus californicus Koch. We obtained no good specimens of this handsome brachiopod, but I saw numbers of fine ones which had been brought in by the fishermen.

MOLLUSCA.

Nucula belloti A. Adams. One live specimen from about 40 fathoms.

Leda taphria Dall. Many empty valves and a few small live specimens were obtained almost everywhere that we dredged in the bay. 12 to 40 fathoms.

Leda hamata Carpenter. Occasionally found with the preceding.

Barbatia gradata Sowerby. Living; 12 fathoms.

Glycimeris intermedia Broderip. No living specimens were obtained, but fresh valves were dredged in twelve fathoms of water.

Philobrya setosa Carpenter. 12 fathoms. Found attached by its byssus to bunches of coralline, which it closely resembles in color and is exceedingly difficult to distinguish. Not rare, and many were doubtless thrown away before we discovered the habitat of this tiny but none the less interesting mollusk.

Mytilus californianus Conrad. This animal covers the rocks just above the low-water mark and may be gathered by the tubful, if one is willing to risk the almost certain wetting he will get, if he clambers too far out on the exposed headlands, which are the mussel's favorite haunts.

Septifer bifurcatus Reeve. Not rare between tides.

Modiolus fornicatus Carpenter. 12 to 40 fathoms.

Modiolus rectus Conr. 20 fathoms.

Modiolus rectus var. *flabellatus* Gould. One enormous specimen of this variety was obtained which had been brought in by the fishermen. It far exceeds in size any other Mytilid in my cabinet.

Adula falcata Gould. Living in the hard blue clay with other borers. 12 fathoms.

Lithophagus plumula Hanley. With the above; not uncommon.

Crenella divaricata Orbigny. 25 fathoms.

Pecten hastatus Sowerby. 12-40 fathoms. No very large or brightly-colored specimens were obtained.

Pecten hericeus Gould. One fine valve came up in the dredge from the blue clay region off Del Monte. 12 fathoms.

Pecten diegensis Dall. Young specimens were dredged with *P. hericeus* and *P. hastatus*. The fishermen sometimes bring in beautiful adult specimens from the coral banks.

Pecten (Hinnites) giganteus Gray. A few were found at low-tide attached to the under surfaces of rocks. At the great Tide Pool,

where a good "minus" tide lays bare several acres of rocks and weeds, and which teems with all sorts of marine life, this species seems fairly common.

Lima dehiscens Conrad. Living; 12 fathoms.

Monia macroschisma Deshayes. Living; from shore line to 12 fathoms.

Cardita subquadrata Carpenter. Living; shore line to 12 fathoms.

Milneria minima Dall. 12 fathoms; not common, as we found it.

Kellia luperousii Deshayes. Found living on shore and also dredged at 12 fathoms.

With it occurs the following:

Kellia suborbicularis Montagu.

Rochfortia tumida Carpenter. Shore line to 40 fathoms.

Diplodonta orbella Gould. Valves were found on the beach and the species was dredged at 25 fathoms.

Phacoides californicus Conrad. Low-tide to 40 fathoms. Fairly common.

Phacoides approximatus Dall. 40 fathoms.

Phacoides annulatus Reeve. One valve was dredged at a depth of about 25 fathoms.

Chama pellucida Sowerby. Low-tide to 12 fathoms.

Cardium quadrigenarium Conrad. 12 fathoms; only a few very young valves found.

**Cardium fucanum* Dall. One live specimen and several valves dredged at 20 fathoms. It is notable that *C. corbis* Mart. was not obtained. See description in NAUTILUS, XX, p. 111.

Protocardia centifilosa Carpenter. Living; 12 to 30 fathoms.

Psidium occidentale Newcomb. Found in numbers in an old watering-trough at Pacific Grove.

Transennella tantilla Gould. Living; between tides.

Tivela stultorum Mawe. Between tides.

Tivela (?) *marginata* Cpr. One valve, found between tides, was thus identified at the National Museum.

Saxidomus nuttalli Conrad. 40 fathoms.

Marcia subdiaphana Carpenter. 25 fathoms; valves only.

Paphia staminea Conr.

Paphia staminea var. *petiti* Deshayes.

Paphia staminea var. *orbella* Carpenter. All found nestling among the rocks between tides.

Paphia tenerrima Carpenter. 12 fathoms; immature valves only.
Venerupis lamellifera Conrad. Some very pretty specimens of this species were found from the shore line down to 12 fathoms.

Psephidea ovalis Dall. 12 fathoms.

Petricola carditoides Conrad. 12 fathoms; in the blue clay.

Petricola californica Conrad. 25 fathoms; valves only.

Psammobia californica Conrad. Low-tide to 12 fathoms; not common.

Tellina salmonea Carpenter. 40 fathoms; rare.

Macoma yoldiformis Carpenter. 40 fathoms; off Moss Landing. One specimen.

Semele rubropicta Dall. 25 fathoms; valves only.

Semele pulchra Sowerby. 12 fathoms; valves only.

Cumingia californica Conrad. Not uncommon at low-tide.

Cooperella scintilliformis Carpenter. 40 fathoms; one live but immature specimen.

Sphenia californica Conrad. Low-tide to 15 fathoms; not rare.

Corbula luteola Cpr. 15 fathoms.

Saxicava arctica Linné. Low-tide to 12 fathoms.

Saxicava pholadis Linné. Low-tide to 12 fathoms. Several very large specimens were found in the abandoned holes of borers.

Siliqua lucida Conrad. Living; 15 fathoms; rare.

Solen sicarius Gould. Living; 40 fathoms.

Spisula planulata Conrad. Very common at about 12 fathoms' depth.

Spisula catilliformis Conr. One valve only; 40 fathoms; off Moss Landing.

Lyonsia nitida Conrad. 12 fathoms; rare.

Lyonsia spongiophila Dall. Low-tide to 12 fathoms; quite rare.

Mytilimeria nuttalli Conrad. Found at low-tide curiously embedded in sponges or colonies of ascidians. The live animals would be passed over and found rarely, except by accident, were it not for the distortion in the masses of their hosts caused by their presence, or for the oddly-shaped openings which permit the sea water to reach them.

Entodesma saxicola Baird. Among the rocks at low-tide.

Parapholas californicus Conrad. 12 fathoms. At this depth the dredge often brought up large fragments of a hard, blue clay which, upon examination, was found to be filled with dead and living specimens of this and other boring mollusks, such as *Petricola*, *Adula*,

Pholadidea, etc. Other crevices of this same blue clay yielded *Ocin-ebra* and many of the finest *Chitons* obtained.

Pholadidea penita Conrad. Found with the above.

Pholadidea sagitta Stearns. Found with the above and at a depth of 40 fathoms off Moss Landing.

Pholadidea parva Tryon. In *Haliotis* shells.

Pholadidea (*Netastomella*) *darwinii* Sowerby. 12 fathoms; in the blue clay.

Dentalium neohexagonum Pilsbry. 12 fathoms.

Dentalium rectius Carpenter (?). 12 fathoms. One beautiful specimen over an inch long is probably referable to this species.

Cadulus nitentior Carpenter. 12 fathoms; not uncommon.

Tornatina harpa Dall. 12 to 40 fathoms.

(*To be concluded.*)

A NEW CERITHIUM FROM THE FLORIDA KEYS.

BY WILLIAM HEALY DALL.

CERITHIUM STANTONI n. sp.

Shell solid, acute, conic, the nine whorls rapidly enlarging; sculpture of 7-9 strong, rounded, axial ribs extending from the suture to the periphery, crossed by small, sharply elevated, subequal, some times alternate, close set spiral threads which cover the whole shell; these threads behind the periphery are white, the striæ between them tend to be blackish-brown except on the most prominent part of the ribs where they are yellowish cream color; from the periphery to the canal the threads as well as the interspaces are brown, and on the canal become lighter again, but are probably more or less variable as in other species of the genus; last whorl with a single varix opposite the outer lip; aperture semi-lunar, on the body callous, with a strong subsutural ridge setting off a posterior sulcus; the pillar callous, twisted, very short, smooth; the outer lip thickened, reflected, internally sharply lirate; interior white. Lon. of shell 35, of last whorl 16, of aperture 12, max. diam. of shell 17, of aperture 6 mm.

Shoals near St. George Cay, Belize, Rev. W. A. Stanton (150294); Florida Keys (110469).

A hermit crab fragment retaining its coloration, sent by Father Stanton, was long believed to be due to foreign ballast, as nothing of the sort was known from the West Indies. The recent acquisition of a bleached but entire specimen from the Florida Keys has confirmed its American habitat.

The species is nearest the *C. guiniacum* Philippi (1849) from the Gaboon, West Africa, but is more conical, and wider in the last whorl, and rather larger. The sharp regular striation and few large rounded ribs are its most striking characteristics.

AMONG THE CEPHALOPODS.

BY R. E. C. STEARNS.

According to the papers, the big steamship *Northwestern* that went ashore last March on La Touche Island, southeastern Alaska, has been floated and is now at Valdez.

Divers making the survey of the bottom of the sea where the steamer rested, were driven away repeatedly by "great cuttlefish, which swarmed in the vicinity of the wreck." It was feared that these "sea monsters" would prevent the saving of the vessel, but the divers proved game, made the necessary survey, drilled the holes for the dynamite, and laid the charge which blew to atoms the rock that had trapped the steamer, without damaging the vessel.

May 3, 1907.

PUBLICATIONS RECEIVED.

THE MOLLUSCA OF COLORADO (University of Colorado Studies, vol. iv, no. 2, 3, Feb. and Apr., 1907). By Junius Henderson. This useful addition to the series of state hand-books of mollusks gives an epitome of earlier work by Ingersoll, Cockerell and others, with substantial additions to the list of species (some 25 being here first reported from Colorado), and to the locality records. A key to species and a bibliography are given. Most of the species are illustrated, the *Unionidæ* by excellent original figures, the snails by cuts

borrowed from Binney's works. "The study of the influence of altitude upon mollusks in this region has given chiefly negative results. Instead of dwarfing the species, as in Montana and other regions where the cold of high altitudes is more intense, the higher altitudes seem more favorable to land snails than lower levels, because of the increased humidity. The finest specimens of *Oreohelix strigosa* and *Vitrina alaskana* found have been at 11,000 and 9,300 feet respectively." "Among bivalves we have found *Pisidia* at 11,000 feet, *Calyculina* at 8,500 feet."

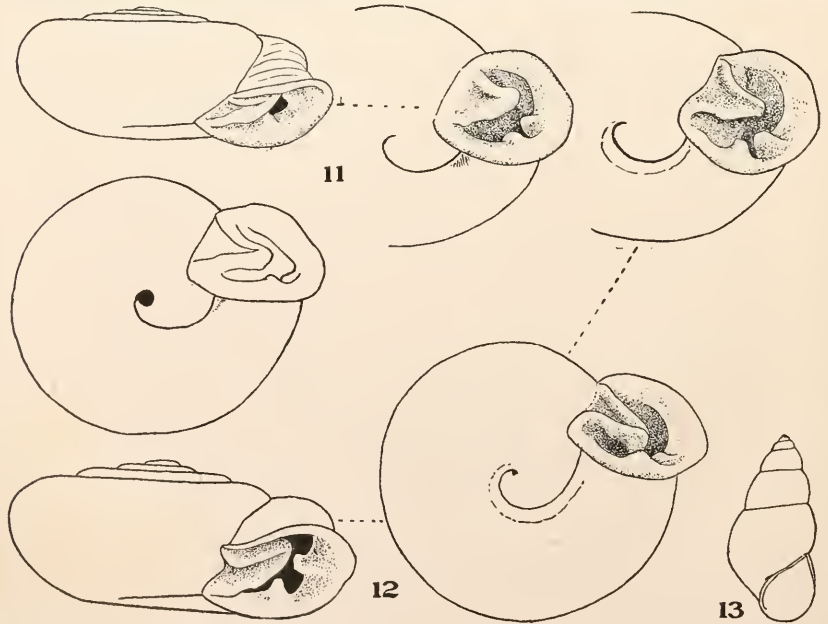
Regarding some of the older records the author remarks upon "doubts as to the accuracy of identification in many instances in the early reports." Such difficulties are always encountered, and their removal costs much time and labor. The identification of "*Zonitoides conspectus*," *Succinea salleana*, *nuttalliana*, *rusticana*, *Ancylus fragilis* and *caurinus* and *Physa heterostropha* should especially be looked into. The paper will form an excellent basis for further work in Colorado, and will be useful for work anywhere in the Rockies.

THE RESULTS OF DEEP-SEA INVESTIGATION IN THE TASMAN SEA. MOLLUSCA FROM EIGHTY FATHOMS OFF NARRABEEN. By C. HEDLEY (Records of the Australian Museum, vi, pp. 283-304, pls. 54-56). This paper contains descriptions of 18 new species, including a new genus, *Coriarius* related to *Lasæa*. The species are all beautifully illustrated.

NOTES.

ERRATA.—The differences between the two New England species of *Acmaea*. The NAUTILUS, May, 1907. About half way down the 3d page: ". . . radula of an adult shell of *alveus* are perhaps the squarest of all, fig. 4." This should be "fig. 3." Also several lines farther down ". . . nearly at right angles to the next tooth and the cusp of (U) faces the center of the lingual membrane (L)." The (L) should be after the word "tooth."

HENRY JACKSON, JR.



1-10, *PACHYCHEILUS VALLESSENSIS*. 11, *POLYGYRA POLITA*.
12, *P. AULACOMPHALA*. 13, *PALUDESTRINA TAMPICOENSIS*.

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No. 3.

DESCRIPTION OF A NEW MEXICAN PACHYCHEILUS.

BY ANSON A. HINKLEY.

PACHYCHEILUS VALLESENSIS n. sp. Pl. 5, figs. 1-10.

Shell conic, solid, smooth; suture impressed; aperture widely ovate, circular at the base, obtusely angular above, purple within; whorls 7, convex; on young and also well preserved specimens the apical ones are slightly carinate or striate; spire about half the length of the shell.

Operculum corneous, spiral, nucleus subcentral; when viewed from above has a little resemblance to a small *Planorbis*.

Length 32, diam. 16 mm.

Length 33, diam. 19 mm.

Habitat. Valles river, Valles, State of San Luis Potosi, Mexico.

"This species resembles short forms of *P. lævissimus*, from which it differs by the absence of fine spiral lines, the more heavily calloused columellar lip, and the darker interior. No other *Pachycheilus* has been found so far north."¹

The species is named from the river in which it is the most plentiful mollusk. Figure 1 may be considered the type, though its size is above the average. There is often a flattening of the body whorl and occasionally a constriction or shallow groove, as on some of the *Pleurocera*. Mature specimens usually show 6 whorls; when the spire is well preserved, as in fig. 8 and fig. 9, there are 8. In young specimens the aperture is angular below, see fig. 5. In mature

¹ Note from Dr. H. A. Pilsbry. The plate illustrating this species will appear in the next number.

specimens the callous deposit on the columella is heavy, and where it meets the labium above, it is very thick. This is well shown in figs. 3 and 8; within the aperture the outer lip is bordered by a lighter-colored or white zone.

All mature specimens and many of the immature ones are more or less covered with a deposit of calcareous matter, which is often so thick as to mislead as to the form of the shell, see figs. 4 and 9.

Individuals are very numerous in some places, and scattering ones can be found almost anywhere in the river. The very young were found where there was little or no current, on sand or mud bottom, or on roots and plants at the water's edge; older ones were common on rocks or the river bed where the current was strong.

At two places the alluvial soil, though above any indication of high-water, contained large numbers of this species, reminding the writer of the remains of *Tulotoma magnifica* at places along the Coosa river in Alabama.

Figures 8 and 9 are from the stream of a spring, and are more perfect in the spire than those from the river, fig. 8 has the deposit all removed, and fig. 9 has enough removed to show the spire. Fig. 10 is not mature; it will be seen that the heavy columellar callus is not yet formed. Fig. 2 is an extra large one; it and figs. 3 and 7 are more than usually inflated. Much smaller ones were found than the one shown in fig. 5.

DESCRIPTIONS OF NEW MEXICAN LAND SHELLS.

BY HENRY A. PILSBRY.

A full account of the mollusks collected by Mr. A. A. Hinkley in the vicinity of Tampico and in the State of San Luis Potosi will later be submitted by him; meantime some of the new forms are described below.

Polygyra (?) *martensiana* n. sp. Pl. V, figs. 11, 12.

The shell is rather thin, depressed, about the shape of *P. texasiana*, umbilicate, the umbilicus rapidly contracting within; surface glossy, pale brownish-corneous with a faint brown band above the periphery, weakly marked with unequal growth-lines. Upper surface nearly flat, the spire being very low conic; periphery above the middle, the base convex. Whorls $4\frac{1}{2}$ to $5\frac{1}{4}$, convex, slowly increasing, the first

smooth, the last whorl very indistinctly subangular in front of the aperture, elsewhere rounded peripherally, slightly descending in front. The aperture is very oblique, wider than high, about one-fourth of its circumference is excised by the preceding whorl; peristome evenly, rather narrowly reflexed throughout, slightly dilated at the axial termination; parietal callus thin and transparent.

Alt. 6, diam. 11, width of umbilicus 2 mm.

Alt. 8.8, diam. 4.8 mm.

Tampico, Mexico, type loc.; also Valles, farther inland, in the State of San Luis Potosi.

This species is remarkable for the complete absence of teeth in the aperture, in other respects having a general resemblance to *Polygyras* of the *texasiana* group. Its generic position can be decided only by examination of the soft anatomy. It may possibly be a *Praticolella*. Six examples were taken at Tampico, one at Valles. Named for the late Professor E. von Martens.

Holospira hinklei n. sp. Pl. III, figs. 3, 4.

The shell is fusiform, widest above the middle, at the seventh whorl, above which it tapers rapidly and below slowly; whitish. Whorls nearly 10, the first smooth, projecting, flattened above, with a central dimple, the second whorl narrower, very convex, smooth; following whorls sculptured with very oblique well raised threads, rather sparse on the early whorls, then more numerous, but separated by spaces wider than the threads. The whorls of the cone are somewhat flattened, except near the lower suture where they are abruptly curved, and the threads are a little enlarged. On the penult and last whorls the threads become strongly arcuate; the whorls are convex, with very deep sutures. The latter part of the last whorl becomes free and descends deeply. It is somewhat flattened on the upper and outer faces, elsewhere rounded. The aperture is transversely ovate, brown within, with a continuous, very broadly expanded, flattened, thin peristome. Internally there are four laminæ: a strong parietal which arises in the latter part of the penult and continues to where the last whorl becomes free; a shorter columellar, in the median part of the last whorl; a high basal lamina in the first half of the last whorl, and a thin but well-developed palatal lamina, below the middle of the outer wall, in the first half of the last whorl.

Length 9.8, diam. 2.9 mm.

El Abra, State of San Luis Potosi, Mexico, collected by A. A. Hinkley.

This species is well characterized by the freely descending last whorl, the "neck" being much longer than in any other member of the typical subgenus of *Holospira*. The four internal laminae are well developed, and situated somewhat lower than in *H. goldfussi*. Eight specimens were taken, part of them immature.

ZONITOIDES PENTAGYRA n. sp. Pl. III, figs. 6, 7, 8.

The shell is slightly larger than *Z. minuscula*, umbilicate, the width of the umbilicus contained between 4 and $4\frac{1}{2}$ times in that of the shell; thin, whitish in the dead specimens seen, similar in color to *Z. minuscula*. Surface glossy, marked with very weak growth-lines, and with very faint fine spiral striae on the base, more distinct in immature shells.

Spire quite convex. Whorls 5, narrow and very slowly increasing, convex, the last well rounded peripherally. Aperture somewhat oblique, quite small, and narrowly lunate. Peristome simple as usual.

Alt. 1.4, diam. 2.7 mm.

Tampico, in river drift, with *Z. minuscula* and *Z.ingleyana* and various *Pupillidae*, etc. Type no. 93796 A. N. S. P., from Mr. Hinkley's collection.

This species is readily distinguished from the two associated forms of *Zonitoides* by the closely coiled whorls and the small, narrowly lunate aperture. It has some resemblance to *Pycnogyra berendti*, of the region of Vera Cruz. It is comparatively rare in the river debris, while *Z. minuscula* and *ingleyana* occur in copious quantity.

SPIRAXIS TAMPICOENSIS Pilsbry. Pl. III, fig. 5.

Drift debris at Tampico. This very slender shell has been described in the current number of the *Manual of Conchology*, p. 24.

CECILIOIDES (CÆCILIANOPSIS) JOD n. sp.

The shell is imperforate, very minute, oblong, slowly tapering to an obtuse summit, whitish (probably clear corneous when living), smooth and glossy. Whorls $4\frac{1}{2}$, slightly convex. Aperture less than half the total length, piriform, shaped like that of *Euglandina*, the outer lip arcuate, thin, columella very concave, covered with a thin callous film, distinctly truncate at the base. Length 2.1, diam. 1 mm.

Tampico, in river debris, abundant.

This tiny snail seems to be at least subgenerically distinct from *Cæcilianella* (*Ceciloides*) by the very obtuse summit and short wide spire. It is closely related to *A. consobrina* Orb.

IN RE CYTHEREA PETECHIALIS OF CARPENTER'S MAZATLAN
CATALOGUE.

BY ROBERT E. C. STEARNS.

In Dr. Dall's "Synopsis of the Family Veneridæ,"¹ etc., he remarks "*Cytherea petechialis* Lamarck, 1818, is listed by Carpenter from Mazatlan having been found among the Reigen shells, but it is certainly exotic, none having appeared from there for half a century."

It is not unlikely that the shell collected by Reigen was an example of the exceedingly rare and handsome variety of *Macrocallista* (*Chionella*) *squalida*, the color markings of which are suggestive of the Asiatic *petechialis*. In my paper on "The Shells of the Tres Marias,"² etc., etc., under *Cytherea* (*Callista*) *chionæa* I refer to the matter. I have never seen more than half a dozen examples of the variety. The National Museum contains if I am not mistaken two or more specimens.

I am quite familiar with *squalida* as well as *petechialis* having had a great many of both species, and for many years distributed both freely in the course of exchanges. The West Coast species is common in Scammon's Lagoon with *Macron Æthiops* Reeve (= *M. Kellettii* Hinds) and elsewhere on both sides of the peninsula and in the Gulf of California.

THE U. S. COAST SURVEY EXPEDITION TO ALASKA IN THE YEAR 1867.

BY ROBERT E. C. STEARNS.

If not a stroke of genius, it was a timely inspiration that caused Dr. C. Hart Merriam to expand what might have been hardly more than a notable pleasure excursion into an important scientific expedition. Probably never before were so many eminent scientific men brought together, and under such agreeable circumstances, as formed

¹ Proc. U. S. Nat. Museum, p. 408, vol. xxvi, 1902.

² Proc. U. S. Nat. Museum, p. 153, vol. xvii, 1894.

the party that went north on the steamer *G. W. Elder*, constituting the Harriman Alaska Expedition.

It was also a happy thought that led Dr. Dall to utilize the opportunity for publication in the Harriman Expedition Series, of his volume on the "Land and Fresh-Water Mollusks," which has been appropriately reviewed by Dr. Pilsbry.¹ It will doubtless be a standard reference book for the next quarter of a century.

The number of species collected by the expedition is nowhere stated. With a copy of Dr. Dall's volume before me, memory recalls what was an important event in its time, forty years ago, the U. S. Coast Survey Expedition to Alaska,² in charge of Professor George Davidson, which left San Francisco, July 21, 1867, and returning, arrived in San Francisco on the following 18th of November.

In this, the first expedition under the flag in connection with the acquisition of Alaska, or perhaps more accurately, Russian America, provision was made for biological investigation, hence my special interest in it, and further, for the reason that two members of the biological staff were kindly appointed by Professor Davidson on my suggestion. Mr. W. G. W. Harford was the conchologist and general collector. The season proved unfavorable, the weather being bad, and the collection of mollusks, therefore, in number of species, was small. Of the marine forms 69 species were taken; the *Buccinidæ* were determined by Dr. William Stimpson, the rest by the writer. The few land shells as named below, were identified by Dr. J. G. Cooper.

Helix columbiana Lea, Sitka; Chilcot River, 59° 9' N.

Helix vancouverensis Lea, Sitka; Vancouver Island.

Helix rudrata Stud., Ounalaska.

Helix fulva Drap., Sitka; Ounalaska.

Vitrina pellucida Müll. (?).

Zua lubrica Müll., Sitka; Kodiak.

The list as it appeared in the Coast Survey volume, contained many typographical errors; it was subsequently revised and published by me.³

¹ The NAUTILUS, Vol. XIX, December, 1905.

² Report of the Supt. U. S. Coast Survey, during the year 1867. Appendix No. 18, pp. 187-329. Washington, D. C., 1869.

³ Shells collected by the U. S. Coast Survey Expedition to Alaska in the year 1867. Proc. Cal. Acad. Nat. Sciences, Dec. 2, 1867.

This and the other paper¹ mentioned in the foot-note, which contained a few pages on the circumboreal distribution of molluscan species, were omitted from the bibliography of Dr. Dall's volume.

A FEW NOTES ON SAY'S EARLY WRITINGS AND SPECIES.

BY V. STERKI.

Again and again, these last years, I have looked over a copy of T. Say's "Conchology" in the "British Encyclopedia" (Nicholson's),² and found a few things which caught my attention particularly and appear worth mentioning and discussing if compared with our present interpretation. It is unnecessary to say that the remarks are not written for the sake of criticizing the father of conchology in this country. His difficulties were doubtless great with respect to both working up his material and having the articles printed according to his intentions.

Of the introduction and general description, I would refer only to one point or two. Say justly protests against the view then prevalent, that the beaks of a bivalve mark the under side, stating that in the natural position of the mussel they are above. At the same time, what we now regard as anterior and posterior parts, he designates as the right and left sides, evidently from lack of knowledge of the organization of the soft parts. Hence also the terms: "æquilateral and inæquilateral," for which we now must say "equipartite and inequipartite." He calls the distance from the beaks to the opposite or "posterior" margin as length, the one at right angles to it as breadth, as some noted conchologists have done up to recent years. It is interesting to note, however, that soon he approached a more correct conception, even in the same article: in descriptions, *e. g.*, of *Unio ovatus* and *ochraceus*, and *Anodonta marginata*, he speaks of a front and a posterior end, only mistakes them for each other, a view which also has been held tenaciously for a long time by many conchologists. In this way apparent contradictions are

¹ On the History and Distribution of the Fresh-water Mussels, etc. Proc. Cal. Acad. Sciences, Nov. 20, 1882.

² Probably of 1818 or 1819; there is no date, and nothing referring to the time of publication, except that the author mentions his "detached essays in the Journ. Acad. Nat. Sc.," and to the "former editions of this work."

easily explained. That Say terms primary teeth what we now call cardinals or pseudocardinals, may be mentioned by the way.

As to the arrangement it is interesting to note that the first genus is *Helix* (made up of our *Polygyra*, *Zonitidæ*, *Vallonia*, *Strobilops*, *Patula* [*Pyramidula*], *Helicodiscus*, variously mixed up); then follow: *Polygyra* (P. s. str.), *Oligyra* (= *Helicina*), *Planorbis*, *Lymnæa* (including *Physa*), *Succinea*,¹ *Cyclostoma* (*Valvata*), *Ancylus*, *Palu-*

These things are mentioned just for an historical reminiscence, and also to show the changes brought on by anatomical examination and more minute distinction.

Some notes on species:

Helix lineata. Reference is made to Journ. Acad. Nat. Sc., I, p. 18, but no mention of *Planorbis parallelus*.

Succinea ovalis. Alt. 11.25, aperture alt. 8.75 mill.² Say states that the species is common; how is it, then, that no larger specimens were found, if *ovalis* were identical with *obliqua*? and that Say described the latter as new, only a few years later? (as 17.5 mill. high). A. Binney (Terr. Moll., II, p. 71) asserts that the two are identical, or varieties of the same species, yet does not use the older name; and he does not state whether there are any undoubtedly authentic *ovalis* Say on hand, giving evidence of the identity. In the absence of such, doubts should be permitted. Dr. Dall seems to have the same view.

Unio crassus. From the description it is evident that not only several species are included under the name—as the author himself suspects—but that rather forms of *Unio*, resp. *Quadrula* are understood, including *undulata* Barnes,³ and probably *tuberculata* Raf. A description of *Lamps. ligamentina* would be quite different, and especially so of the prevalent form of the Ohio river (= var. *gibbus* Simpson). The figure has resemblance to a female *L. liga-*

¹ Yet he adds the remark: "The characters of the inhabitant (= soft parts) are widely distinct from the animal of the *Lymnæa*, and are somewhat allied to those of the inhabitants of the *Helices*."

dina (our *Annicola*, *Pomatiopsis*, *Lioplax*, *Goniobasis*, *Vivipara*, *Campelema*), *Pupa*, *Polyphemus* (= *Glandina*), the bivalves: *Unio*, *Alasmodonta*, *Anodonta*, *Cyclas*, *Cyrena*.

² Say gives the dimensions in inches; for convenience of comparing, they are reduced to millimeters.

³ As even more evident from the description of *U. plicata*, following.

mentina. Except eventually for that, *U. crassus* cannot be regarded as a synonym of the species named, and it would be best to drop the name.

Unio plicata. Unfortunately, the author failed to cite the dimensions. To judge from the description and also the locality, Lake Erie, it seems that not the large "typical" *plicata* of *e. g.*, the Mississippi and Ohio rivers was understood, but the well marked "variety," known also *e. g.*, from the Kankakee river.

U. ochraceus. Description and figure evidently are drawn from a young, resp. adolescent specimen, two or three years old, and the differences as pointed out from *cariosus* (the figure represents a mature female) are mostly due to this fact.

Cyclas similis. The description shows decidedly that the mussel understood is not what has been taken for *Sphærium simile*, resp. *G. sulcatum* Lam.; the size given is: long. 10, alt. 8.75 mill. Any specimen of *G. sulcatum*, 10 mill. long, is rather young, not "sub-orbicular," but elongate, and little inflated. The figure also, however imperfect it may be, cannot represent a *G. sulcatum*. The species described seems to be either *G. striatimum* Lam, or *stamineum* Con., probably the former. The statement that "a specimen measured in length¹ nearly three-fifths of an inch," makes it probable that a *G. sulcatum* was mixed in. Whether there are any authentic specimens in a collection, and what they prove, I know not; but from what has been said, we will do well to revert to the name *G. sulcatum* Lam., which seems well established.

There are a number of typographical and other errors, and mistakes in the article; *e. g.*, under *Paludina*, three species are designated as "L.": *Subcarinata*, *Virginica*, *Vivipara*; evidently the author had ranged them under *Lymnaea* previously, and then forgot to change the genus initials. Under *Anodonta marginata*, pl. 3, fig. 3, is cited; evidently it should be fig. 5, although the dimensions do not agree exactly with the description, as they do with respect to other species. *Helix thyroidus* is described. What good reason is there now to spell *thyroides*, after the original spelling had been generally adopted until 1850, and partly later? I allude to this, as compared with *Planorbis exacuus*, which is not in the article considered, that Say himself changed, corrected, the nonsensical and

¹ Probably altitude, in conformity with Say's terminology; no "breadth" is given.

impossible word into *exacutus*, or others did, is enough to show that it was an error. The purpose of nomenclatural rules is to prevent mistakes and misunderstandings; the means, to adhere to the original spelling, so far as consistent with sense. In the case of *Pl. exacutus* for *exacuus*, there is no possibility of a mistake, and I, for one, shall write *exacutus* after this.

In Say's article there is under Cyrena: "Shell triagonally rounded . . .," evidently an error; it should be "trigonally." If this were in a name it would be perpetuated like "exacuus."

MOLLUSCAN FAUNA OF MONTEREY BAY, CALIFORNIA.

BY S. S. BERRY.

(Continued from p. 22.)

Cylichna eximia Baird. 12 fathoms.

Cylichna attonsa Carpenter. 28 fathoms; one young specimen.

Tethys (= *Aplysia*) *californica* Cooper (?). The common sea-hare of Monterey Bay seems to differ somewhat from those of the southern part of the state, and may prove to be distinct when a careful anatomical examination has been made of both. The form obtained is quite common along the shore. It is large and of a brown color, irregularly blotched.

Tethys (*californica*, var.?). A small red form was dredged at 12 fathoms depth, which may or may not prove distinct from the shore form. At any rate, it is very different in appearance.

Archidoris montereyensis Cooper. 25 fathoms. Whether one collects along the shore or dredges in the bay, the Nudibranchs form one of the most striking and characteristic features of marine life in the Monterey region. Neither individuals, nor species, nor even genera, are few in number, as the following incomplete list will show. For the identifications, Professor MacFarland's careful paper on the Monterey Bay opisthobranchs (Bulletin of the Bureau of Fisheries, Vol. XXV) is the best work, and was constantly used by us as a text book in their study. It is beautifully illustrated, and should be in the library of every Pacific coast student.

Anisodoris nobilis MacFarland. Very common at low tide.

Rostanga pulchra MacFarland. A few of these bright-red animals found at low tide.

Diaulula sandiegensis Cooper. Low tide.

Cadlina marginata MacFarland. Very common from the shore line to 25 fathoms.

Chromodoris (sp.?) One specimen dredged. A most elegant creature; brilliant blue marked with yellow. It is now in the hands of Professor MacFarland for dissection and determination.

Doriopsis fulva MacFarland. Shore line to 25 fathoms; very common.

Cregires albopunctatus MacFarland. At low tide.

Laila cockerelli MacFarland. A few found at low tide.

Triopha carpenteri Stearns. Between tides; common.

Triopha maculata MacFarland. Between tides; common.

Polycera atra MacFarland. One specimen found at low tide.

Acanthodoris brunnea MacFarland. 12 fathoms; one specimen.

Hopkinsia rosacea MacFarland. A beautiful rosy pink in color, its body covered with long, tapering papillae, this is one of the most exquisite beings imaginable. It is by no means an uncommon creature in the little rocky tide pools along the shore.

Aeolid (sp.?). Numerous aeolids of many sorts were found along the shore and were dredged, particularly off Moss Landing. Some species were exquisitely beautiful in form and color, but they proved almost impossible to preserve and none were determined.

Selenites duranti Newcomb. Several were found under bits of bark on Cypress Point.

Vertigo (sp. *undet.*). Found rather commonly on Cypress Point.

Punctum conspectum Bland. Cypress Point; one specimen.

Punctum conspectum, var. *pasadenæ* Pilsbry. Near Pacific Grove; one specimen.

Helix aspersa Müller. Pacific Grove; in gardens.

Epiphragmophora californiensis Lea. Cypress Point; rather uncommon there at least.

Epiphragmophora dupetithouarsi Deshayes. Cypress Point, etc. Common, as land shells go in California. One curious specimen obtained is half albino.

Siphonaria peltoides Carpenter. Found at low tide, and live ones were also dredged at 12 fathoms, to my great surprise.

Gadinia reticulata Sowerby. At low tide; Santa Cruz, etc.

Physa heterostrophia Say (?). Santa Cruz, etc.

Planorbis parvus Say. Del Monte pond.

(To be concluded.)

NOTES.

NOTE ON *CYPRÆA COXENI* COX.—Having recently had the good fortune to obtain a specimen of this rare and interesting species, my attention is directed to certain particulars in which it differs materially from the only figure and description at present available to me—those contained in Mr. Roberts' monograph in Tryon's Manual of Conchology. This specimen, which appears to be somewhat worn, has the irregular chestnut-brown markings described as characteristic of the species, but is otherwise entirely white. Instead, however, of being a tapering shell, as shown in the figure referred to, or of being similar to *C. cribraria*, to which it has been compared by Mr. Brazier and Mr. Roberts, it is cylindrical, opaque and heavy in appearance, and its form throughout is almost precisely that of *C. rhinoceros* Souv. (*C. interrupta* Gray, var.?), the white base and margins being the same, but the columellar teeth extending further across the base, as mentioned by Mr. Melvill in his "Survey of the Genus Cypræa" (p. 230). This species should not be confused with *C. Coxii* Braz., a thin yellowish or cream-colored shell, which Dr. Cox believes (MS. letter) is not entitled to specific rank and which Mr. Roberts thinks may have been based upon a young specimen of *C. erroneus*.—FRED. L. BUTTON.

PUBLICATIONS RECEIVED.

THE CONCHOLOGICAL MAGAZINE: A monthly devoted to the study of Japanese shells. Published by Y. Hirase, Kyoto, Japan.¹ A new expression of the activity of our neighbors across the Pacific is before us in this handsomely printed and illustrated Magazine edited by Mr. Hirase, of which four numbers have come to hand. It is a gratifying evidence that the progress of Japan is to be intellectual as well as material. The April number contains articles on collecting shells, the philology of shell names. Japanese marine mollusks, the classification of Japanese land shells, etc., etc., a total of 34 pages and three excellent phototype plates. The text is of course in Japanese, but the plates make it interesting to conchologists of the Western World, and should give the Magazine a circulation outside of Japan among all interested in Pacific shells. The NAUTILUS heartily welcomes the new *Conchological Magazine*.

¹Subscription to foreign countries \$1.50 per annum.

THE NAUTILUS.

VOL. XXI.

AUGUST, 1907.

No. 4.

A NEW SUBSPECIES OF *POLYGYRA MULTILINEATA*.

BY JAS. H. FERRISS.

POLYGYRA MULTILINEATA CHADWICKI n. var.

This is a dentate form. In a lot of thirty specimens twenty-five had a lunate parietal tooth or thickening of the callus about three mm. in length extending obliquely across the aperture nearer the outer lip. In other respects, compared to *multilineata*, the shell is heavier, the spire higher, the whorls more ventricose, the suture deeper; it is moderately polished, the sculpturing is less acute, the furrows shallow; the aperture is less oblique, less lunate; the peristome thicker, face more rounded, contracting the aperture more. In some examples the parietal callus is a mere ribbon in front of the aperture 5 mm. in width, not extending within the aperture itself. The greatest diameter 21 mm., alt. 13 mm.

In color these run from yellowish-white to light cherry. In five specimens only were the revolving lines observed, and these faintly. In general appearance it is quite like the Arkansas mountain forms, bearing a neighborly likeness to *albolabris allenii*, *indianorum*, *binneyana* and *edentata*. It was collected on the banks of the Kaw river, near Lawrence, Kansas, by W. C. Chadwick, of Cleveland, Ohio, and is named in his honor.

In the Illinois river valley we have two sizes of *multilineata*, one in the open bog measuring from 18 to 23 mm. in diameter, the other in wet timber land measuring from 25 to 28 mm. in diameter, well supplied with revolving lines. The smaller size varies in color from

a solid cherry-brown to white, and when lined there is a wide variation in the number of lines.

NEW LAND AND FRESH-WATER SHELLS FROM MEXICO.

BY H. A. PILSBRY AND A. A. HINKLEY.

POLYGYRA POLITA n. sp. Pl. 5, fig. 11.

The shell is narrowly perforate, with a rather long rimation, discoidal, the spire very slightly convex; whitish corneous (probably partially bleached), glossy, with faint sculpture of weak growth lines only. The whorls increase slowly; the last one is rounded at the periphery and descends abruptly at the aperture; it is constricted and opaque white behind the lip, and there is a short oblique groove within the umbilicus. Aperture very oblique. The peristome is thick, expanded outwardly, reflexed below, the ends connected by a rather thick callus, which bears a rather long, obliquely V-shaped tooth, the upper branch of which, though not so high as the lower, is well developed and connects with the peristome. There are two strong lip teeth, the upper one peripheral in position, tubercular, the lower one basal, compressed, entering across the lip-callus; a low, rather sharp lip-callus, more immersed at its lower end, is above the upper tooth.

Alt. 4, diam. 9.6 mm.; width of umbilicus 2.6 mm.; whorls 5.

Tampico, in river débris, coll. by A. A. Hinkley.

This species closely resembles *P. texasiana hyperolia* Pils. and Ferr., but it differs by the wider constriction or furrow behind the peristome, and the decidedly more deeply immersed upper lip tooth. The umbilical rimation is also longer than usual in that form.

POLYGYRA AULACOMPHALA n. sp. Pl. 5, fig. 12.

The shell is very narrowly perforate, with a rather long rimation, subdiscoidal, with low spire; whitish corneous (probably bleached), glossy, faintly, finely striate above, smoother below, where faint traces of spiral striæ are visible. Whorls slowly increasing, the first projecting slightly, the last rounded peripherally, descending a little in front, constricted behind the outer and basal margins of the peristome, with shallow pits in these positions. A long, deep furrow on

the last whorl within the umbilicus runs parallel to the rimation, but does not quite reach to the peristome. The aperture is oblique, peristome thin, well expanded, reflexed below, terminations converging, joined by a rather heavy callus, which bears a large obliquely and narrowly V-shaped parietal tooth, the upper branch connecting with the peristome, the lower branch somewhat sinuous. The upper lip tooth is peripheral, the lower basal, both compressed and entering. There is an acute, obliquely entering ridge within the lip, above the upper lip tooth, and connected with its inner end. Inside the last whorl a low columellar lamella indicates the position of the external furrow.

Alt. 4.3, diam. 10, width of umbilicus 3 mm.; whorls 5.

Tampico, in river débris, coll. by A. A. Hinkley.

This species is closely related to *P. polita*, but differs from that by the very long and deep groove on the last whorl within the umbilicus, the thin lip, longer teeth and smaller perforation. Further fresh specimens are needed to complete the descriptions of both, since the types are bleached shells from river débris.

PALUDESTRINA TAMPICOENSIS n. sp. Pl. 5, fig. 13.

The shell is very minutely perforate or imperforate, rather narrowly conic, thin, corneous, nearly smooth, the glossy surface but slightly striatulate; apex acute. Whorls 6, moderately convex; suture moderately impressed, with a gray margin by transparence. Aperture slightly oblique, ovate, angular above; lip thin and simple, the columellar margin concave, hardly reflexed.

Alt. 3.7, diam. 1.8 mm.

Tampico, in river débris, coll. by A. A. H.

Of this little species only a few specimens were taken. It is related to *P. monroensis* Fild., and is not close to any species yet known from Mexico or Texas.

MOLLUSCAN FAUNA OF MONTEREY BAY, CALIFORNIA.

BY S. S. BERRY.

(Continued from page 35.)

Conus californicus Hinds. Shore to 12 fathoms.

Pleurotoma carpenteriana Gabb. Several individuals of this

beautiful species were dredged in from 12 to 15 fathoms. It is one of the most attractive shells to be found in the Bay.

Daphnella fuscoligata Dall. One good specimen was found between tides by some little children who gave it over to me.

Drillia inermis Hinds. 12 fathoms; living; one specimen.

Drillia torosa Carpenter. 12 fathoms, and dead specimens on the beach.

Clathurella canfieldi Dall. Living under rocks at the big Tide Pool.

Mangilia angulata Carpenter. 12 fathoms.

Mangilia hexagona Gabb. 12 fathoms.

Mangilia sculpturata Dall. 12 fathoms.

Cancellaria cooperi Gabb. 15 fathoms; one living, but immature specimen.

Olivella biplicata Sowerby. Between tides.

Olivella pedroana Conrad. 12 fathoms.

Olivella intorta Carpenter. 15 fathoms, sand; occurring with the "sand-dollars."

Marginella jewettii Carpenter. Between tides; dead, but good shells common on the beach.

Marginella pyriformis Carpenter. Shore to 12 fathoms.

Marginella regularis Carpenter. 12 fathoms; with the preceding.

Mitra maura Swainson. 12 fathoms; several specimens. One magnificent live individual was nearly three inches long.

Mitromorpha filosa Carpenter. Between tides.

Mitromorpha aspera Carpenter. 12 fathoms.

Fusus luteopictus Dall. On and under stones between tides; not rare.

Fusus robustus Trask. 12 fathoms; living; occasional examples.

Nassa mendica Gould. 12 fathoms; evidently exceedingly common at moderate depths.

Nassa mendica, var. *cooperi* Forbes. With the preceding and perhaps even more common.

Nassa perpinguis Hinds. 12 fathoms; few obtained.

Nassa fossata Gould. Fishermen.

Nassa californiana Conrad. Fishermen and a few examples dredged in 40 fathoms, off Moss Landing.

Amphissa versicolor Dall. Exceedingly common from the shore into 12 fathoms.

Columbella aurantiaca Dall. Between tides; rare.

Columbella tuberosa Carpenter. Low tide to fifteen fathoms; common.

Columbella gausapata Gould. Common from the shore line to 12 fathoms.

Columbella gausapata, var. *carinata* Hinds. With the preceding and in greater numbers.

Murex carpenteri Dall. 12 fathoms; one of the finest species in the Bay. It is very different in appearance from the *M. carpenteri* of San Pedro.

Murex petri Dall. A few young shells referred to this species by Dr. Dall were dredged with *M. carpenteri* and the *Calliostoma* in the blue-clay region.

Murex foliatus Martyn. 12 fathoms; with the preceding; three or four splendid examples.

Murex nuttalli Conrad. At low tide.

Murex (Ocinebra) barbarensis Gabb. 12 fathoms; two good live and several dead shells.

Murex (Ocinebra) squamuliferus Carpenter. Two living examples dredged with the preceding.

Murex (Ocinebra) gracillimus Stearns. Between tides.

Murex (Ocinebra) circumtextus Stearns. Fairly common at low tide. The specimens run much larger than in the southern part of the state.

Murex (Ocinebra) luridus Middendorf. Between tides; rather common. Specimens were found connecting this species with the following variety.

Murex (Ocinebra) luridus, var. *asperus* Baird. Between tides; not common.

Murex (Ocinebra) luridus, var. *mundus* Carpenter. Between tides; less common than typical *luridus*.

Murex (Ocinebra) interfossus Carpenter. Shore to 15 fathoms; not uncommon.

Murex (Ocinebra) peritus Hinds. One living specimen found at low tide.

Murex (Ocinebra) subangulatus Stearns. Low tide; one specimen.

Purpura saxicola Valenciennes. Between tides; very common.

Purpura lima Martyn. Between tides; rare.

Monoceros lapilloides Conrad. Between tides.

Scala lindsii Carpenter. Between tides; the most common species of the genus. It may be found living by searching among the sea-anemones.

Scala subcoronata Carpenter. With the preceding, but less abundant.

Scala crebricostata Carpenter. Living at 12 fathoms, off Del Monte, and dead on the beach at Santa Cruz.

Scala berryi Dall. A small species occurring in almost every dredge haul in some localities, but good specimens rare. 12 fathoms.

Scala rectilaminata Dall. 15 fathoms. (NAUTILUS, xx, p. 127.)

Scala (Cirsotrema) montereyensis Dall. 25 fathoms.

Scala (Opalia) borealis Gould. Between tides rather rare.

Scala (Opalia) pluricostata Carpenter. 12 fathoms; one specimen.

Scala (Opalia) spongiosa Carpenter. Two specimens of this pretty, but tiny species. 12 fathoms.

Eulima rutila Carpenter. 12 fathoms; rather scarce.

Eulima thesites Carpenter. With the above. Living example rare.

Turbonilla aurantia Carpenter. 12 fathoms.

Turbonilla (Mormula) tridentata Carpenter. 12 fathoms.

Turbonilla (Strioturbonilla) torquata Gould. 12 fathoms.

Turbonilla (Strioturbonilla) serræ. Dall & Bartsch. 12 fathoms.

All of these are rare species, this being of most often occurrence.

Turbonilla (Strioturbonilla) vancouverensis Baird. 28 fathoms; one living specimen.

Turbonilla (sp. undet.). 12 fathoms.

Odostomia (Chrysallida) oregona Dall and Bartsch. Rare; 12 fathoms.

Odostomia (Chrysallida) montereyensis Dall and Bartsch. 12 fathoms; not so rare as most of the other *Odostomia*.

Odostomia (Amaura) montereyensis Dall and Bartsch. 12 fathoms.

Odostomia (Iolæa) amianta Dall and Bartsch. 12 fathoms; not infrequent.

Odostomia (Evalea) straminea Carpenter. On abalone shells brought up from just below the low-tide mark. Common, but found in no other locality.

Odostomia (Evalea) angularis Dall and Bartsch. Shore line to 12 fathoms; rare.

Odostomia (Ividea) navisa Dall and Bartch. 12 fathoms.

Odostomia (Evalea) valdezi Dall and Bartch. 12 fathoms, two specimens.

Priene oregonense Redfield. Fishermen; rare.

Gyrineum californicum Hinds. Fishermen. Also dredged in 12 fathoms. Of rather frequent occurrence.

Pedicularia californica Newcomb. On corals brought in by the fishermen. One beautiful specimen is over half an inch in diameter.

Trivia californica Gray. 12 fathoms; one live specimen.

Radius variabilis C. B. Adams. The dealers and fishermen often show examples of this species said to have been found in the bay, but the first really authentic specimen from Monterey seen by the writer, was a single immature specimen dredged by him. 12 fathoms; living.

Radius barbarensis, Dall. Fishermen. Quite rare. The only specimen obtained is over an inch in length and one of the most beautiful products of the bay.

Erato columbella Menke. Low tide.

Erato vitellina Menke. Several beautiful examples were found alive at low tide.

Triforis adversus Montagu. Between tides.

Triforis montereyensis Bartsch. 12 fathoms; a single broken specimen.

Metaxia diadema Bartsch. 12 to 28 fathoms; rare.

Scila assimilata C. B. Adams. Between tides.

Cerithiopsis purpurea Carpenter. Between tides. Dead shells common.

Cerithiopsis munita Carpenter. 12 fathoms.

Cerithiopsis tuberculata Carpenter. Low tide.

Cerithiopsis interfossa Carpenter. On the beach; one specimen.

Bittium filosum Gould. Between tides; plentiful.

Bittium esuriens Carpenter. Between tides; not common.

Cæcum californicum Dall. 12 fathoms; plentiful.

Cæcum quadratum Carpenter. Found occasionally with the preceding.

Cæcum crebriinectum Carpenter. Rather commonly with the preceding. The specimens were unusually large and fine.

Vermetus lituella Carpenter. Between tides.

Vermetus squamigerus Carpenter. Between tides; not common.

Bivouia compacta Carpenter. Shore to 25 fathoms. Found either singly or in contorted masses and not at all rare.

Littorina planaxis Nuttall. Abundant.

Littorina scutulata Gould. Abundant.

Lacuna unifasciata Carpenter. Dead shells common and living individuals not rare at low tide.

Fossarus (Isapis) fenestratus Carpenter. Shore to 12 fathoms.

Diala marmorea Carpenter. Shore to 12 fathoms.

Rissoa acutilirata Carpenter. 12 to 25 fathoms; plentiful, but usually dead.

Rissoina bakeri Bartsch. 12 to 25 fathoms; rare.

Rissoina purpurea Dall. 12 fathoms; a single specimen.

Barleia haliotiphila Carpenter. Between tides; plentiful.

Calyptræa mamillaris Broderip. 12 fathoms; no living specimens found.

Crepidula adunca Sowerby. Shore to 20 fathoms and everywhere plentiful. Found almost invariably on shore attached to the shells of the black turban, *Chlorostoma funebrale*. Specimens dredged were usually of a lighter color, deeper, and distorted.

Crepidula nivea Gould. Found at low tide, adhering to the under surfaces of stones.

Crepidula dorsata Broderip. Low tide to 20 fathoms, particularly among sponges and kelp-roots.

Crepidula lessonii Broderip. Low tide to 20 fathoms; rather uncommon, but usually in old holes of Pholads, etc.

Amalthea antiquata Linné. Found in large colonies attached to the under surfaces of rocks at the Big Tide Pool.

Luuatia lewisii Gould. Fishermen, etc. Not rare.

Luuatia draconis Dall. Fishermen, etc. Also dredged alive in 12 fathoms of water. An examination of a number of individuals of each of these species, as to whether the shells showed any very noticeable sexual differences failed to reveal anything striking.

Eumaticina oldroydii Dall. Fishermen, etc. None were dredged by our party, though this mollusk seems to be a characteristic feature of the Bay.

Velutina lævigata Linné. 12 fathoms; one immature shell.

Lamellaria rhombica Dall. 15 fathoms; living; one specimen.

Acmaea asuri Middendorf. Not rare on the shells of the black turban (*Chlorostoma*), but occurring nowhere else. Perhaps this is a case of commensalism.

Acmaea incessa Hinds. On seaweed at low tide.

Acmaea instabilis Gould. With the preceding.

Acmaea triangularis Carpenter. 12 fathoms. Not rare among red sponge on the hard clay and always accompanied by the following species.

Acmaea rosacea Carpenter. 12 fathoms; all quite small specimens. Also on shore.

Acmaea mitra Eschscholtz. Between tides, but usually far out on exposed rocks. Shells always encrusted with a growth of "coralline," etc.

Acmaea patina Eschscholtz. Between tides; plentiful.

Acmaea patina, var. *scutum*. Between tides.

Acmaea patina, var. *fenestrata* Nuttall. Between tides; rather rare.

Acmaea scabra Reeve. Between tides; abundant.

Acmaea pelta Eschscholtz. Between tides; common.

Acmaea pelta, var. *nacelloides* Dall. Between tides; not rare.

Acmaea persona Eschscholtz. Between tides; common.

Acmaea spectrum Nuttall. Between tides; common.

Acmaea (*Lottia*) *gigantea* Gray. Between tides; abundant.

Phasianella compta Gould. Shore line to 12 fathoms.

Phasianella (*compta*, var.) *pulloides* Carpenter. With the preceding.

Eucosmia variegata Carpenter. Between tides; uncommon.

Eulithidium substriatum Carpenter. A few specimens dredged at 12 fathoms depth.

Pachypoma inequale Martyn. One of the finest species in the region. It occurs all the way from low water mark at least down to a depth of fifteen fathoms and is by no means rare. A few specimens obtained are extraordinarily large and heavy.

Leptothyra bacula Carpenter. Between tides; common.

Leptothyra paucicostata Dall. Between tides; one poor specimen.

Leptothyra carpenteri Pilsbry. Between tides; common. Also to 20 fathoms depth.

Norrissia norrissii Sowerby. 12 fathoms; one very young specimen.

Calliostoma annulatum Martyn. 12 fathoms; not rare. Several beautiful examples of this exquisite species.

Calliostoma canaliculatum Martyn. 12 fathoms, and a number of

exceptionally large examples obtained from the Chinamen. Young specimens were often found living also at the low water mark.

Calliostoma costatum Martyn. Shore to 12 fathoms; common. Young specimens often lined with bright blue.

Calliostoma supragranosum Carpenter. Low tide to 12 fathoms; rare.

Calliostoma splendens Carpenter. 12 fathoms; quite rare.

Calliostoma gloriosum Dall. Dead shells on shore, and a few living but small specimens dredged in 12 fathoms of water.

Margarita lirulata Carpenter. Between tides; common.

Margarita pupilla Gould. A few specimens were found at low tide. They are of the form known as var. *salmonea* Carpenter.

Gibbula parcipicta Carpenter (= *M. lirulata* var.). 12 fathoms.

Chlorostoma funebre A. Adams. Between tides; abundant.

Chlorostoma brunneum Philippi. *C. funebre* covers the rocks everywhere, but one must go at low tide to successfully search for *C. brunneum*, although it is common.

Chlorostoma montereyi Kiener. 12 fathoms; dead. Also from the fishermen.

Chlorostoma pulligo Martyn. 12 fathoms; not rare but usually rather small.

Halistylus pupoides Carpenter. 12 fathoms; common, occurring invariably with *Caecum crebricinctum*, and the two species run through the same variations in color.

Seissilabra dalli Bartsch. 12 fathoms; one specimen.

Liotia acuticostata Carpenter. 12 fathoms.

Vitrinella eshnauri Bartsch. 12 fathoms.

Vitrinella berryi Bartsch. 12 fathoms. Described with other *Vitrinellidæ* in the Proceedings of the United States National Museum, Vol. XXXII, pp. 167, 176.

Cyclostremella californica Bartsch. 12 fathoms.

Haliotis cracherodii Leach. Between tides; abundant.

Haliotis rufescens Swainson. Especially plentiful just below low water mark.

Haliotis gigantea Chemnitz. 15 fathoms; one dead shell. An animal and shell in alcohol among the laboratory collections was undoubtedly collected in the bay. Both specimens were but two or three inches long.

Fissurella volcano Reeve. Between tides to 12 fathoms; common.

Fissuridea aspera Eschscholtz. Between tides to 12 fathoms; not rare.

Fissuridea murina Dall. Shore to 12 fathoms; some specimens quite fresh but all dead and then not of common occurrence.

Lucapina crenulata Sowerby. Low tide.

Megatebennus bimaculatus Dall. Quite a number found alive at low tide.

Subemarginula yatesi Dall. A single fine specimen was obtained which had been brought in by fishermen from deep water. It is evidently extremely rare.

Puncturella cucullata Gould. 12 fathoms. This also seems to be quite rare in this locality, though one living and several dead shells were dredged from a depth of twelve fathoms.

Lepidopleurus rugatus Carpenter. Not rare at low tide.

Lepidopleurus ambustus Dall. Several examples were found on the fragments of blue clay dredged in 12 fathoms of water.

Lepidopleurus (*Oldroydia*) *percrassus* Dall. 12 fathoms. On the blue clay with the other chitons were found two fine specimens.

Tonicella lineata Wood. Between tides to 12 fathoms. The species does not run so large here as further north, but is often very beautifully colored.

Trachydermon ruber Lowe. 12 fathoms; one specimen. It was a surprise to find this cold-water species at Monterey.

Trachydermon hartwegii Carpenter. Common on the rocks between tides everywhere.

(To be concluded.)

NOTES.

ADDITIONS to the "Catalogue of the Shell Bearing Mollusca of Rhode Island," 1889, are the following:

Lucina filosa, Stimps.

Odostomia impressa, Say.

Pisidium Streatori, Sterki.

Pisidium Roperi, Sterki.

Pisidium Noveboracense, Prime.—H. F. CARPENTER.

OYSTERS ARE WILD ANIMALS.—"Domesticated, tame or garden oysters are assessable as personal property, according to an opinion

of Attorney-General Jackson, written in answer to a query addressed to the tax commission by G. Frank Tuthill, supervisor of the town of Southold, inquiring whether oyster beds should be assessed as real or personal property and to what purpose the taxes derived therefrom are to be devoted. The courts have held, says Mr. Jackson, that oysters are wild animals and become personal property when they are reclaimed or artificially planted. Such domesticated, tame or 'garden' oysters would be assessable as personal property under the ordinary rules."—(*Boston Globe*.)

STUDENTS of the Unionidæ may be interested to know that on June 10th I have collected a number of female *Tritogonia tuberculata* (Barnes) gravid. All four branchiæ were charged with ova. More details will be communicated later.—V. STERKI.

PUBLICATIONS RECEIVED.

A PRELIMINARY CATALOGUE OF THE LAND AND FRESH-WATER MOLLUSCA OF OHIO. By V. Sterki (Proc. Ohio State Acad. of Science, iv, part 8). This very valuable addition to our State catalogues gives an epitome of Dr. Sterki's work in Ohio in the past twenty years, with such other species as have been reported on good authority from the State. The total number, 310 species, is probably exceeded by no Northern State. Attention is called to species which should specially be looked for in Ohio, such as *Gastrodontagularis*, *Omphalina lævigata*, etc. A separate list is given of species from pleistocene deposits. Dr. Sterki's notes on the various species will be read with interest by those engaged in similar studies, his intimate acquaintance with inland mollusks giving weight to the views expressed.

A NEW PARASITIC MOLLUSK OF THE GENUS EULIMA. By Paul Bartsch (Proc. U. S. Nat. Mus., 1907). *E. ptilocrinicola* lives parasitic on *Ptilocrinus pinnatus* Clark, dredged by the steamer *Albatross* off British Columbia in 1588 fms. The proboscis is deeply inserted in the side of the body of the crinoid. This is like *Stylifer*, yet the apex is not mucronate as in that genus, and there is an operculum. The largest specimen is 9.5 mm. long.



UNIO GIGAS 'SWAINS.' SOWB (HYRIOPSIS CUMINGII LEA). CHINA.
(About $\frac{3}{4}$ nat. size).

THE NAUTILUS.

VOL. XXI.

SEPTEMBER, 1907.

No. 5.

NOTES ON SOME EXOTIC UNIONIDÆ.

BY L. S. FRIERSON.

The collation of some private notes upon *The Synopsis of the Naiades* by Mr. Chas. T. Simpson called my attention to several errors in this great work. In the *Synopsis* Mr. Simpson dealt not only with a great number of species, but with an enormous mass of references to an involved and difficult literature. The following notes are therefore offered in no unduly critical spirit.

UNIO GIGAS (Swainson) Sby., U. CUMINGII Lea.

Page 608, Mr. Simpson places (it is true, somewhat in doubt) as a synonym of *Tritogonia tuberculata*, Barnes, the figure of *Unio gigas*, Swainson (Sowerby, in *Conchologia Iconica* xvi, 1867, Plate LVI, fig 287).

This really fine figure has been totally misunderstood by both Mr. Simpson and Mr. R. E. Call, the latter having more than once referred it to *Unio multiplicatus* Lea. It is probable that the habitat assigned the shell by Sowerby—the Ohio river—is responsible for these singularly poor determinations. Mr. Lea was not much misled by the habitat, for in his synopsis he placed it among the foreign shells, and in his scheme of classification he placed *U. gigas* immediately next to his *Unio cumingii*. The fact is that *gigas* is only an adult *cumingii*. The type of the latter was a shell not one-third grown, and hence only slightly resembling a full-grown specimen.

As Mr. Lea afterwards received several large *cumingii* he was of course acquainted with its appearance, and hence his placing the two shells together. But the tenacity with which Mr. Lea "hung on" to his names is an old story, and accounts for his placing them as *allied* but *distinct* species, in his classification.

However, even though synonymous with each other, it is probable that *gigas* has not precedence, since it was published by Sowerby long after Lea's *U. cumingii*. Moreover, *U. gigas* Sowerby is probably not the undescribed *U. gigas* of Swainson.

An adult specimen of the species under discussion is illustrated on Plate VI, from the writer's collection. It is 209 mm. long, and was received from China.

The remains of the high wing, and the broad biangulated posterior, the purplish color inside, and the *wrinkled umbones* amply distinguish *U. gigas* (*cumingii*) from either of the shells with which it was united by Mr. Simpson and Mr. Call.

ANODON MORETONIANUS Sowerby.

On page 925 of the synopsis Mr. Simpson makes a variety *moretonianus* Sowerby of *Glabaris trapesialis* Lamarek. The variety being shown in Sowerby, *Conchologia Iconica* xvii, 1867, Pl. IX, fig. 20. This appears to be a singular error. The shell figured not only is *not trapesialis* Lk., but is nothing like it. It is more than probable that Mr. Simpson in haste, made a "*lapsus pennæ*" and really intended to make a variety *susannæ* Gray; for this shell is close to, if not identical with *trapesialis*, and is figured on the *same plate* to which we are referred. But be this as it may, the *Anodon moretonianus* of Sowerby (as of Lea) is nothing like *Glabaris trapesialis* Lam.

UNIO PLICATULUS Lea.

A singular *lapsus* seems to have been made on page 353 when the genus *Ctenodesma* is described and the type assigned is the *Unio borneensis* Issel, better known perhaps as the *U. plicatulus* of Lea. But there can be but little doubt that this shell (i. e., the *U. plicatulus* Lea.) is not a member of the *Ctenodesma* at all, but unquestionably belongs to the next described genus *Rectidens*.

MOLLUSCAN FAUNA OF MONTEREY BAY, CALIFORNIA.

BY S. S. BERRY.

(Concluded from page 47.)

Trachydermon flectens var. *montereyensis* Bartsch. 12 fathoms; several specimens.

Chaetopleura gemmea Carpenter. Low tide to 12 fathoms; quite common in places. Most of the specimens are a rather bright orange-red in color.

Chaetopleura rosetta Bartsch. A very small species dredged in 12 fathoms depth. One specimen was likewise found at low tide.

Ischnochiton magdalenensis Hinds. This is the commonest shore chiton and lives under boulders in dozens. The young specimens are often very handsome and vary considerably in coloration and marking.

Ischnochiton mertensii Middendorf. Low tide to 12 fathoms. Not rare. This is also a variable species as regards color and markings, though generally of a brownish-red. The sculpture of fine specimens is wonderfully distinct and is but rarely obscured by foreign growths, or eroded as in the case of so many of the other species.

Ischnochiton cooperi Carpenter. Low tide; but few found.

Ischnochiton clathratus Reeve. A single oddly-marked specimen was found at low tide by a fellow-student at the laboratory.

Ischnochiton radians Carpenter. Low tide to 12 fathoms. Two of the specimens found were nearly black, almost unmarked, and with so exactly similar a color pattern (not in the least intergrading with the ordinary form) that the writer was very doubtful as to whether they were properly referred to this species, but they were identified as *radians* by Dr. Dall. They seem at least a very well marked variety.

Ischnochiton berryi Bartsch. Six adult specimens and a young one were found in the crevices of the blue clay from 12 fathoms. They were generally living with a purplish sponge which they resembled in color. The largest specimen taken measured one and a half centimeters in length in the living state.

Ischnochiton veredentiensis Carpenter. 12 fathoms; two or three specimens.

Ischnochiton regularis Carpenter. Three or four specimens were found at low tide. I am told that this is generally a common species around Pacific Grove, but we did not find it so.

Callistochiton palmulatus Carpenter. 22 fathoms. Two specimens.

Callistochiton palmulatus var. *mirabilis* Pillsbry. Low tide; not rare.

Callistochiton crassicosatus Pillsbry. Low tide; not rare.

Nuttallina californica Nuttall. Exceedingly common between tides on the rocks.

Mopalia muscosa Gould. Low tide to 12 fathoms. Very common.

Mopalia hindsii Sowerby. Low tide; not rare. No specimens showing any intergradation between this species and the preceding or the next were observed.

Mopalia lignosa Gould. Between tides; common.

Mopalia ciliata Sowerby. 12 fathoms; four specimens. All the specimens taken were predominantly red in color, but sometimes mottled with white, brown and green. A very striking and handsome species.

Mopalia ciliata var. *wossnesenskii* Middendorf. 12 fathoms; one specimen.

Placiphorella velata Carpenter. A number of specimens of this interesting species were found at low tide.

Katherina tunicata Sowerby. Several specimens were obtained far out on the rocks among the mussels.

Cryptochiton stelleri Middendorf. A few specimens found at low tide.

In conclusion it may be well to call attention to several interesting features of Monterey's mollusk fauna which are presented by the foregoing list: the extraordinary development of the chitons (some twenty-six species and four varieties); the large representation of *Ocenebra* (ten species and varieties), of *Scala* (eight species), and of the *Pyramidellidae* (fourteen species); and the prominence of *Acmaeidae* in the shore fauna, both as regards number of species and varieties (fifteen) and of individuals.

TWO NEW SPECIES OF LYMNÆA.

BY FRANK COLLINS BAKER.

LYMNÆA JACKSONENSIS n. sp.

Limnea catascopium BINNEY (part), Land and Fresh-water Shells of North America, II, 1865, p. 56, fig. 86, two central figures.

Shell ovately fusiform, solid; color very dark horn; surface shining, lines of growth coarse, crossed by deeply incised spiral lines sagrinating the surface; one or two rest periods are discernible as longitudinal bands on the body whorl or spire; apex smooth, very dark chestnut color; whorls $5\frac{1}{2}$, rounded, rather rapidly increasing in size; body whorl large, ovately-inflated; sutures well impressed; spire about equal to the aperture in length, broadly conical; aperture regularly elongate-ovate, narrowed at both ends, somewhat effuse anteriorly; outer lip with a chestnut-bordered internal lip; inner lip in the adult rather broadly reflected over the umbilicus, leaving a small, narrow chink; juvenile specimens are almost imperforate; parietal callus rather heavy in some specimens, in which case making a continuous peritreme; axis very slightly twisted; columella with a well-marked fold, more strikingly developed in young than in old specimens.

Length 19.0, width 10.0, aperture length 10.1, width 5.0, mm.

Length 16.5, width 9.5, aperture length 9.1, width 4.8, mm.

Length 14.5, width 8.5, aperture length 8.5, width 4.0, mm.

Length 14.0, width 7.5, aperture length 7.5, width 3.4, mm.

Length 12.5, width 7.5, aperture length 8.0, width 3.5, mm.

Types: Chicago Academy of Sciences, 6 specimens.

Cotypes: Collections of Acad. Nat. Sci., Phila., and of A. A. Hinkley.

Type locality: Jackson Lake, drained by the south fork of the Snake River, Wyoming.

Records: Oregon: Grindstone Creek (Hayden, Smithsonian collection). Wyoming: Jackson Lake; Philips Lake, eight miles north of Jackson Lake (H. O. Hinkley, A. A. Hinkley).

Remarks: This species was received from Mr. A. A. Hinkley, of Du Bois, Illinois, under the name of *L. binneyi*. Comparison with Tryon's types at once showed that it was not that species, which is larger, of a different color and with a differently-shaped shell, inner lip, umbilicus, etc. It approaches *L. gabbi* Tryon, but the aperture is more regularly elongate-ovate, the whorls are rounder, the inner lip is broader, there is an umbilical chink and the whole shell is more fusiform. Comparison has been made with Tryon's types and with a set in the Chicago Academy of Sciences received from Tryon from the original lot. The species resembles very closely in color and in the form of the columella certain forms of *apicina* (= *solida* preoccupied) but the spire of *jacksonensis* is longer and the aperture, narrower.

It has some resemblance to *L. catascopium* but the columella is quite different and the aperture is differently shaped. Binney's two central figures in Land and F.-W. Shells, fig. 86 accurately picture the species and the original specimens in the Smithsonian (No. 8304) seem to be the same. It has probably been named *binneyi* or *solida* in collections but it seems to be a distinct species, related to the *binneyi-solida-catascopium* group of *Lymnæas*. Mr. H. O. Hinkley collected the specimens.

LYMNÆA PSEUDOPINGUIS n. sp.

Shell globose or globosely ovate, thin and fragile; color very light corneous inclining to yellowish, sometimes brownish; surface dull to shining, but not polished, growth lines very heavy and spiral lines deeply incised; whorls 4 +, rounded; the body-whorl globosely inflated, the whorls increase very rapidly in size, the last whorl occupying from $\frac{3}{4}$ to $\frac{5}{8}$ of the length of the shell; spire usually short, depressed, dome-like, sometimes more elongated; sutures well-marked, bordered below by a wide, yellowish band; aperture ovate or roundly-ovate, sometimes a trifle expanded and somewhat effuse anteriorly; inner lip rather broadly expanded, triangular, reflected over but not closing the umbilicus, which is a conspicuous chink; there is no columellar plait in the majority of specimens; the parietal callus is very thin or wholly lacking. The axis is but slightly twisted.

Length 9.0, width 6.5, aperture length 6.0, width 3.5, mm.

Length 9.0, width 6.0, aperture length 6.0, width 3.5, mm.

Length 9.5, width 6.75, aperture length 6.5, width 3.5, mm.

Length 8.2, width 5.5, aperture length 5.4, width 3.0, mm.

Length 8.0, width 5.5, aperture length 5.0, width 3.0, mm.

Length 14.0, width 8.0, aperture length 8.0, width 4.3, mm.

Length 12.5, width 7.5, aperture length 7.3, width 4.0, mm.

Length 11.0, width 7.0, aperture length 7.0, width 3.5, mm.

Length 7.2, width 5.0, aperture length 5.0, width 3.0, mm. Mt. Sinai.

Length 7.5, width 5.0, aperture length 5.0, width 2.5, mm. Mt. Sinai.

Types: Chicago Academy of Sciences; *Cotypes*, collection Miss Mary Walker, Buffalo, N. Y., Mr. Bryant Walker, Detroit, Mich., Academy Natural Sciences, Philadelphia and the Smithsonian Institution, Washington.



LA JOLLA, CALIFORNIA.
(See article by Maxwell Smith, p

Type locality: Crystal Brook, Long Island, N. Y.

Records: Crystal Brook and Mt. Sinai, Long Island, N. Y.

Habitat: In salt or brackish water, "at low tide in shore of bay fed by springs" (Crystal Brook); in ice-cold spring (Mt. Sinai.)

Remarks: This peculiar *Lymnæa* has been somewhat of a puzzle for a long time. It was at first thought to be a variety of *L. catascopium pinguis* but it differs from that form in its thinner shell, more globose form, more dome-shaped spire and particularly in its triangular, smooth, reflected inner lip and distinct umbilical chink. The form of the shell and of the inner lip resembles the *bulimoides* group of *Lymnæas* of the subgenus *Galba*.

It is probably a variation from the *catascopium* stock, produced by unfavorable conditions, which have dwarfed the shell. It is a significant fact that the icy-cold spring at Mt. Sinai has produced the same shell characteristics as the brackish water of Crystal Brook.

There is some variation in the height of the spire in the numerous specimens examined, some individuals having an elongated spire a trifle less than the aperture in length, while in others the spire is less than half the length of the aperture. This shell also varies in corpulency. The inner lip is peculiar and, together with the form of shell, will easily separate this species from *catascopium*, its nearest ally.

The shell was first brought to the notice of the writer by Miss Mary Walker of Buffalo, N. Y., who suggested its resemblance to *L. bulimoides*, and later by Mr. Bryant Walker, of Detroit, Michigan.

ANNOTATED LIST OF THE MOLLUSCA FOUND IN THE VICINITY OF
LA JOLLA, SAN DIEGO CO., CAL.

BY MAXWELL SMITH.

Several winters ago I spent a few months at La Jolla, California. Here an old friend, Mr. Joshua L. Bailey, initiated me in the study of shells. The town lies twelve miles north of San Diego, directly on the coast, and at the base of Mount Soledad. Alternate stretches of beach and rock, caves and muddy shores, afford a congenial home for mollusks. Miniature canyons slope from the hills down to the coast. On the sides of these are found two species of land shells. A

short distance to the south stands Pacific Beach, facing both False Bay and the ocean. Several miles to the north are the Torrey Pines. Here stand, on the bluffs overlooking the sea, splendid specimens of *Pinus torreyanus*. At the base of these cliffs, in a wild spot, a number of interesting finds were made.

Where no locality is given the species is understood to have been found at La Jolla. No dredging was done. Species found on the surface of anemones are marked with a star.

Ostrea lurida, Cpr. False Bay. On stones.

Anomia macroschisma, Desh. After storms.

Anomia lampe, Gray. False Bay. Not rare, but difficult to detach from rocks.

Pecten æquisulcatus, Cpr. False Bay. In mud.

Pecten monotimeris, Conr. Washed ashore on kelp.

Hinnites giganteus, Gray. Single valves.

Lima dehiscens, Conr. Several specimens.

Modiolus californianus, Conr. On rocks.

Septifer bifurcatus, Conr. With above.

Adula falcata, Gld. In soft rock.

Lithophaga plumula, Hanl. A few in rock.

Arca reticulata, Gmel. One alive under stone.

Barbatia gradata, Sby. Many examples under stones.

**Cardita subquadrata*, Cpr. Uncommon.

Milneria minima, Dall. On spire of *Haliotis*.

Diplodonta orbella, Gld. A few at very low tide.

Chama exogyra, Conr. Mostly dead.

Chama pellucida, Sowb. Beautiful examples.

Cardium substriatum, Conr. Small shells.

Cardium quadrigenarium, Conr. Brought in by fishermen.

Tivela stultorum, Mawe. In the sand.

Amiantis callosa, Con. False Bay. A few good examples.

Tapes staminea, Conr. With *Donax*.

Chione succincta, Val. A few living.

Chione undatella, Sby. Pacific Beach. Several examples.

Petricola carditoides, Conr. In rock.

Donax laevigata, Desh. Very abundant in sand.

Heterodonax bimaculatus, D'Orb. Pacific Beach. Soft parts gone.

Tagelus californianus, Conr. Pacific Beach. Living in mud banks.

- Sanguinolaria nuttallii*, Conr. False Bay. Mostly dead shells.
Tellina bodegensis, Hinds. Pacific Beach. Single valves.
Metis alta, Conr. False Bay. One example.
Macoma nasuta, Conr. Not rare.
Semele decisa, Conr. Pacific Beach. A single valve.
Semele rupium, Sby. A few beautiful examples.
Lyonsia californica, Conr. False Bay. Fine shells in the drift.
Pandora bicarinata, Cpr. Pacific Beach. Many single valves.
Platyodon cancellatus, Conr. Torrey Pines. Fresh specimens.
Solen rosaceus, Cpr. False Bay. Young specimens.
Parapholas californica, Conr. Not rare with *Adula*.
Penitella penita, Conr. In soft rock.
Dentalium neohexagonum, S. & P. Pacific Beach. In sand.
 **Cadulus quadrifissus*, Cpr. One fine shell.
 **Cavolinia tridentata*, Forsk. Worn specimens.
Actaeon punctocaelatus, Cpr. False Bay. Among the drift.
 **Tornatina culcitella*, Gld. A single young specimen.
Tornatina cerealis, Gld. False Bay. Abundant in drift.
Bulla gouldiana, Pils. False Bay. Very plentiful.
Haminea vesicula, Gld. False Bay. Empty shells.
Haminea virescens, Sby. South La Jolla. On alga-covered rocks.
Tylodina fungina, Gabb. On brown algae.
 **Pedipes unisulcatus*, J. G. C. Several hundred in two days.
Melampus olivaceus, Cpr. False Bay. Abundant with *Cerithidea*.
Siphonaria peltoides, Cpr. One washed ashore.
Gadinia reticulata, Sby. On the beaches.
Physa sp. indet. In a small reservoir back of the town.
Succinea rustica, Gld. San Diego Mission. On the muddy banks of a small stream.
Helix aspersa, Muller. I took several dozen to the town and released them in a garden. Today they may still be found.
Epiphragmophora tudiculata, Binney. Among the roots of cacti.
Epiphragmophora stearnsiana, Gabb. False Bay. A few specimens on the beach, probably washed from Point Loma.
Glyptostoma newberryanum, W. G. B. Plentiful ten miles inland.
Terebra simplex, Cpr. Pacific Beach. Uncommon.

- Conus californicus*, Hds. Plentiful under rocks.
Pleurotoma carpenteriana, Gabb. Torrey Pines. Several dozen.
Drillia moesta, Cpr. Under stones.
Drillia inermis, Hds. Pacific Beach. Several specimens.
Drillia penicillata, Cpr. Mostly dead.
**Mangilia striosa*, C. Adams. Fine large specimens.
Cancellaria cooperi, Gabb. Torrey Pines. One example.
Olivella biplicata, Sby. Common in the sand.
Olivella pedroana, Conr. With above.
Marginella jewettii, Cpr. Several worn specimens.
**Marginella pyriformis*, Cpr. Plentiful.
Marginella varia, Sby. Living, under stones.
Mitra maura, Swain. Several found living. The pure white animal contrasts strongly with the dark shell.
Mitromorpha aspersa, Cpr. Rare.
**Mitromorpha filosa*, Cpr. Not plentiful.
Siphonalia kellestii, Fbs. Brought in by fishermen.
Macron lividus, A. Adams. Under stones.
Nassa fossata, Gld. One living shell.
Nassa mendica, Gld. Pacific Beach. A few worn specimens.
Nassa mendica, Gld., var. *cooperi*, Fbs. False Bay. One example.
Nassa perpinguis, Hinds. Mostly inhabited by hermit crabs.
Nassa tegula, Rve. False Bay. Common in muddy stations.
Columbella guasapata, Gld. On eel-grass.
Columbella guasapata, Gld., var. *carinata*, Hds. With above.
Amphissa corrugata, Rve. Several found living.
**Amphissa versicolor*, Dall. One shell.
Murex festivus Hds. Under rocks.
Murex incisus, Brod. Common in rock pools.
Murex nuttallii, Conr. Pacific Beach. Many examples.
Ocenebra interfossa, Cpr. On the beaches.
Ocenebra poulsoni, Mutt. Pacific Beach. With *Murex festivus*.
Ocenebra gracillima, Strs. Among drift.
Trophon belcheri, Hds. Brought in by fishermen.
Monoceros engonatum, Cpr. Not rare.
Monoceros lapilloides, Conr. Several living shells.
Scala crenatoides, Cpr. Crevices of rock.
Scala hindsii, Cpr. Common.

Scala tineta, Cpr. Young specimens.

Janthina exigua, Lan. Found on beaches after storms.

Janthina sp. indet. False Bay. A single example.

**Eulima micans*, Cpr. Several large shells.

**Eulima rutila*, Cpr. One specimen.

**Eulima incurva*, Ren. Bleached specimens.

Pyramidella conica, Ads., var. *variegata*, Cpr. A single example.

Turbonilla tridentata, Cooper. Large specimens.

**Odostomia nuciformis*, Cpr. One fine shell.

(*To be concluded.*)

NOTES.

NOTE ON *TRIVIA PILULA* KIENER.—This minute species, heretofore known particularly through specimens from the Hawaiian Islands, was described by Kiener in his "Coquilles Vivantes," (no date, but about 1840) p. 151, pl. 54, f. 2, the habitat being then unknown. It was mentioned by Reeve (*Conch. Iconica*, 1845, p. 56, f. 524*) as a synonym of the very much larger West Indian species, *Tr. globosa* Gray. Sowerby in his "Thesaurus Conchyliorum" (1870), Melvill, in his paper on the "Survey of the Genus *Cypræa*," (1888), and Roberts, in his monograph in Tryon's *Manual of Conchology*" (1885) all followed Reeve in this respect. Weinkauff, however, in his *Systematisches Conchylien-Cabinet*" of Kuster (1881, pp. 159, 152), deemed it entitled to specific rank. This view, in which my study of these species has long since led me to concur, is now further confirmed by the opinions of three other conchologists in the recent "Report to the Government of Ceylon on the Pearl Oyster Fisheries of the Gulf of Manaar—Supp. Rept. on the Molluscan Shells, by Robert Standen and Alfred Leicester," (1906). Among the species found are mentioned both *Tr. globosa* and *Tr. pilula* (by typographical error named as "*Tr. fibula*"), with the remark added, as to the last named species, that they "agree with Mr. J. M. Williams (of Liverpool), to whom the specimens were submitted, that they are not the same as *Tr. globosa* Gray."

FRED L. BUTTON.

THE ANCEY COLLECTION OF SHELLS.—We learn that the collection of shells of the late C. F. Ancey, of Mascara, Algeria, has

been acquired by Monsieur Geret, Conchologist, 76 rue Faubourg, St. Denis, Paris, France. This collection, which is one of the most important in Land and Fresh-water shells, will be sold to suit the purchaser. Collectors can from now on send to M. Geret to reserve any species or type which they may desire from this magnificent collection.

ANGELO HEILPRIN.

Professor Angelo Heilprin, the well-known naturalist died in New York City, July 17. He was born in Hungary, March 31, 1853, and came to the United States in 1856. He was Professor of Invertebrate Paleontology and Geology, (1880-1900), and Curator, from 1883 to 1892 of the Academy of Natural Sciences, and Professor of Geology at the Wagner Free Institute of Science 1885-90. For several years past he held the Lectureship on Physical Geography at Yale University.

While most of the works of Prof. Heilprin pertained to geology and physical geography, there are a number which are of special interest to conchologists. "Animal Life of the Seashore," and the "Bermuda Islands": a contribution to the physical history and zoölogy, both treat extensively of the mollusca. "Explorations on the West Coast of Florida" (Trans. Wagner Free Inst. Sci. Vol. I). On this expedition the richly fossiliferous pliocene of the Caloosahatchie was discovered and many of the interesting species of mollusks described, together with a number of those from the "silex-bearing marl" of Tampa Bay, now classed as Oligocene. Professor Heilprin has also published numerous papers in the Proceedings of the Academy of Natural Sciences. His later works deal principally with volcanic phenomena, especially Mont Pelée, where he was one of the first scientific observers on the ground.

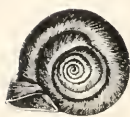
Professor Heilprin possessed to an unusual degree the ability to interest non-scientific people in scientific matters; and to the inspiration of his personal teaching many owe the beginnings of a deep interest in geology, geography and other natural history studies. Personally, Professor Heilprin was infectiously optimistic and confident. He successfully organized and led numerous scientific expeditions; and his death was due to the effects of a tropical fever, contracted on an expedition to the Orinoco river, about a year ago.



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NOTES ON PLANORBIS.—I.

BY BRYANT WALKER.

PLANORBIS MULTIVOLVIS Case. Plate VIII.

This species was described by William Case, of Cleveland, O., in 1847 (*Am. Jour. Sc.* [2], III, p. 101), from specimens collected by Captain B. A. Stannard, "in the northern part of Michigan." Most, if not all, of these specimens, apparently, were given by Case to Dr. Gould, who distributed a few and deposited the balance in the collection of the Boston Society of Natural History. Examples were sent to the Cuming Collection (now in the British Museum), from which the species was well illustrated in the *Conchologia Iconica* by Sowerby, whose figures were copied in the *Conchylien Cabinet*.

A single specimen found its way into the Jay Collection now in the American Museum of Natural History, and another was given to the Smithsonian Institution. Subsequently Dr. Gould gave several specimens to Dr. W. H. Dall, which are now in the National Museum. So far as I have been able to ascertain, the original lot is not represented in any other collections.

From that time until 1906 nothing further has been known of the species. In 1888 (*J. of C.*, V, p. 330), on the authority of the late Geo. W. Tryon, Jr., I announced the re-discovery of the long-lost species in Marl Lake, Roscommon County, Mich. But a subsequent comparison with genuine specimens showed that the identification was erroneous. The Marl Lake shells are probably *P.*

campanulatus rudentis Dall (See Harriman Alaska Exped., XIII, p. 90).

The citation of *P. multivolvis* from Newfoundland by Farrer in 1892 (NAUTILUS, VI, p. 36) was, as stated by him, based on a comparison with the Marl Lake shells, and his specimens are apparently referable to the same variety.

Through the kindness of Mr. E. A. Smith I have had the opportunity of examining specimens in the British Museum from Labrador labelled "*multivolvis*." They are not that species, however, but a form of *P. campanulatus*.

In the summer of 1906, Dr. Chas. A. Davis of Ann Arbor, Mich., while in the field for the State Geological Survey, had the great good fortune to rediscover the genuine *multivolvis* on the north shore of Howe Lake, Marquette County, Mich., about forty miles west of the City of Marquette. Nine specimens only were obtained. Three of these are figured on the plate (figs. 4 and 8 to 11) and for comparison with them are given figures of one of the original specimens in the National Museum (figs. 1-3) and of the specimen in the Jay Collection (figs. 5-7).

Through the kindness of Mr. L. P. Gratacap of the American Museum, I have been able to make personal comparison of the latter specimen with those from Howe Lake. As shown by these figures, there can be no question as to the identity of the Howe Lake shells with Case's species.

Both of the original specimens figured are apparently much less elevated than the Howe Lake shells, but the upper whorls of the "Jay" specimen were badly eroded so that it was difficult to make out the exact number of whorls, and the depressed spire of the National Museum shell is evidently owing to the very irregular growth, as shown in fig. 3. That some of the original lot were quite as elevated as the Howe Lake specimen is shown by Sowerby's figure 72*a*, for comparison with which fig. 4 is given. The dimensions of this specimen are almost exactly the same as those of Sowerby's figure, and figure 4 would almost pass as an outline facsimile of the other.

It is equally clear that *multivolvis* is a valid species and quite distinct from *campanulatus*. Compared with the latter it is distinguished by its elevated spire with more numerous and narrower whorls and the wide, deep umbilicus.

An apparent peculiarity of Howe Lake shells is the very irregular growth. Of the eight 1906 specimens before me only one (fig. 4) is entirely regular in the coiling of the whorls. Of the others the shell represented by figs. 9-11 is least distorted and figure 8 is most so. That this was also a peculiarity of the original lot is shown by figure 3.

P. multivolvis is apparently a scarce shell in Howe Lake at the present time. Two visits there in July, 1907, each involving a careful search of the entire north shore, only yielded three specimens. It seems probable that the species lives in comparatively deep water during the summer and only comes in towards shore, if at all, for spawning purposes. Such seems to be the habit of the *Lymnæidæ* in Pine Lake, Marquette County, which I have been familiar with for more than ten years, and a similar habit has been noticed by Kirkland in *Lymnæa mighelsi* in Crystal Lake, Benzie Co., Mich. (NAUTILUS, XIV, p. 8.)

The dimensions of the specimens figured are as follows :

	Major diam.	Minor diam.	Axis.
Figs. 1-3	14.00 mm.	11.50 mm.	6.00 mm.
Fig. 4	16.25 mm.	13.00 mm.	9.00 mm.
Figs. 5-7	16.25 mm.	13.00 mm.	7.00 mm.
Fig. 8	18.25 mm.	15.25 mm.	8.25 mm.
Figs. 9-11.....	18.00 mm.	15.00 mm.	9.00 mm.

The actual occurrence of this species in Michigan having thus been definitely determined, there still remains the question as to the locality where the type specimens were obtained. Unfortunately, Capt. Stannard failed to give any definite information on this point, and after the lapse of sixty years, there is no hope of getting any exact information. But it is a fair subject for speculation. One fact is clear, that although but a very small portion of the Upper Peninsula has as yet been explored conchologically, the work that has been done there has, with this one exception, failed to discover it. The species was described in 1847, and the specimens were probably collected within a year or two previous to that time. It is to be borne in mind that at that time the Upper Peninsula was an unbroken and practically an unknown wilderness. The rapid development incident to the growth of the copper, iron and lumber industries had not begun. Marquette was not settled until 1846,

and at that time Houghton was only known to the Indians and voyageurs. What little navigation there was on Lake Superior was between the "Soo" and a few small towns at the upper end of the lake, such as Eagle Harbor, Bayfield, Ontonogan, etc. Stannard was at that time captain of a small sailing craft which plied between these ports. On one of his voyages he discovered the famous rock in the center of the lake now known as Stannard's Rock. It seems clear enough, therefore, that the original locality for the *Planorbis* must have been somewhere on or near the south shore of the lake. The Hon. Peter White, who has lived in Marquette since 1849, informs me that the Indians told him that after Stannard discovered the rock in the middle of the lake, he was very cautious about sailing in stormy weather for fear of getting wrecked on some similar reef, and that at one time during a heavy stress of weather he took refuge under the lee of the Huron Islands and remained there for some days. Now the Huron Islands are only about three miles from the south shore of the lake, and Howe Lake is less than one mile inland and almost directly south of the islands. If during his enforced stay under the shelter of the islands Stannard had gone ashore to fish or hunt it is quite conceivable that he reached the north shore of Howe Lake and there found the shells he afterwards gave to Case.

While of course this is all speculation based on a mere tradition of fact, it certainly raises a possibility, at least, that Howe Lake may have been the original locality for this very interesting species. And, unless in the years to come, the species shall be found in some other locality, which seems more likely to be the original place of discovery, this possibility may prove to be a very good probability.

Note: My last visit to Howe Lake was on August 3d. On August 28th my sister made another visit to the lake and found seven more specimens all but one, unfortunately, more or less broken. During the interval several heavy storms had taken place which stirred up the lake and no doubt brought the shells in to shore. Of these specimens only one was irregularly coiled. The others were all similar to figures 4 and 10 which evidently represent the normal aspect of the form as it occurs in that locality. Considerable variation in size is shown, the largest specimen measuring $10\frac{3}{4} \times 17\frac{3}{4}$ and the smallest $7\frac{1}{2} \times 13\frac{3}{4}$ mm.

ANNOTATED LIST OF THE MOLLUSCA FOUND IN THE VICINITY OF
LA JOLLA, SAN DIEGO CO., CAL.

BY MAXWELL SMITH.

(Concluded from p. 59).

Plate VII, view of La Jolla.

- **Odostomia pupiformis*, Cpr. Mostly worn specimens.
Gyrineum californicum Hds. Pacific Beach. Buried in mud.
Cypraea spadicea, Gray. After violent storms.
Trivia californica, Gray. False Bay. A few living, dead shells
common at La Jolla.
Trivia solandri, Gray. Not rare.
Erato columbella, Menke. In the drift.
Erato vitellina, Hds. Seldom collected alive.
**Triforis adversa*, Mont. Fine shells not rare.
Cerithiopsis tuberculata, Mont. A few small specimens.
**Cerithiopsis metaxæ*, Della Chiaje. False Bay. A single shell.
Bittium quadrifilatum, Cpr. False Bay. On sponges.
Cerithidea californica, Hald. False Bay. With *Melampus*.
Cæcum californicum, Dall. Uncommon.
Cæcum crebricinctum Cpr. Under rocks resting on clean sand.
Vermetus squamigerus, Cpr. Plentiful under stones.
Littorina scutulata, Gld. On the rocks.
Littorina planaxis, Nutt. With above.
**Lacuna unifasciata*, Cpr. Plentiful.
**Fossarus fenestratus*, Cpr. Rare.
**Rissoa compacta*, Cpr. Not often found.
**Rissoina aequisculpta*, Cpr. Not often found.
Truncatella californica, Pfr. False Bay. In drift.
Truncatella stimpsoni, Sby. False Bay. With above.
Crucibulum spinosum, Sby. Pacific Beach. Several specimens
have long spines.
Crepidula aculeata, Gmel. On the beaches.
Crepidula navicelloides, Nutt. In aperture of *Natica*. Identical
with *C. plana*.
Crepidula onyx, Sby. Pacific Beach. On stones.
Amalthea antiquatus, Linn. Under layers of rock.
Amalthea cranioides, Cpr. With above.

- **Amalthea tumens*, Cpr. Young specimens.
Natica draconis, Dall. Rare with *N. lewissii*.
Polinices lewissii, Gld. Pacific Beach. Common, below tide.
Polinices recluziana, Desh. Pacific Beach. Abundant at low tide.
Polinices uber, Val. False Bay. A Lower California shell.
 Not before reported from California.
Lottia gigantea, Gray. Small specimens plentiful on the rocks.
Acmaea asmi, Midd. On *Chlorostoma*.
Acmaea scabra, Rve. Not uncommon.
Acmaea inessa, Hds. Several shells, soft parts gone.
Acmaea mitra, Esch. Torrey Pines. One specimen.
Acmaea paleacea, Gld. On eel-grass, common.
Acmaea patina, Esch. Abundant at all times.
Acmaea persona, Esch., var. *umbonata*, Nutt. Many examples.
Acmaea spectrum, Nutt. On rocks.
Acmaea depicta, Hds. On grasses.
Acmaea rosacea, Cpr. One faded shell.
Phasianella compta, Gld. In drift.
Leptothyra carpenteri, Pils. Two specimens.
Pomaulax undosus, Wood. Many shells at low tide.
Norrisia norrisii, Sby. In algæ.
Calliostoma canaliculatum, Mart. One small shell.
Calliostoma tricolor, Gabb. Pacific Beach. Under small round stones.
Calliostoma gemmulatum, Cpr. Dead shells, rare.
Chlorostoma aureotinctum, Fbs. Not uncommon.
Chlorostoma funebre, Ad. Many examples.
Chlorostoma gallina, Fbs. Not rare.
 **Halistylus pupoides*, Cpr. Not common. A northern species.
 **Ethalia supravallata*, Cpr. Rare.
 **Liotia acuticostata*, Cpr. Several examples.
Liotia fenestrata, Cpr. Beautiful specimens.
 **Vitrinella complanata*, Cpr. Three shells.
Haliotis corrugata, Gray. Pacific Beach. One small example.
Haliotis fulgens, Phil. The most abundant *Haliotis*.
Haliotis rufescens, Swains. Several fine specimens.
Fissurella volcano, Rve. Under stones, common.
Fissuridea murina, Dall. Dead shells.
Lucapina crenulata, Sby. Occasionally found alive.

**Lucapinella callomarginata*, Cpr. Mostly worn shells.

Megatebennus bimaculatus, Dall. In drift.

Mopalia muscosa, Gld. Fine specimens.

Mopalia ciliata, Sby. Several shells.

Nuttallina scabra, Rve. On rocks.

Ischnochiton conspicuus Cpr. Under flat rocks.

NOTES ON THE CONCHOLOGY OF POCONO MANOR, MONROE CO., PA.

BY JOSHUA L. BAILY, JR.

During the past summer it was my fortune to spend six weeks at Mt. Pocono, Monroe Co., Pa., the largest mountain summer-resort in Pennsylvania, and while there had an excellent opportunity to explore the molluscan fauna of a region which has been neglected by conchologists heretofore. The Pocono Inn, at which I stayed, the only hotel on Pocono Manor, is located on Little Pocono Mountain, about 1850 feet above sea-level. From the Inn a fine view may be had on clear days of the Delaware Water Gap. Three miles to the westward lies the source of Swiftwater Creek, which after passing the falls, reaches Lake Minausín, about 500 feet below the level of the Inn. On the other side of the mountain is a smaller stream known as Indian Run, which flows into the Swiftwater about a mile below the lake. The temperature of the water is 45° F. or lower, except in the lake, where the sun shines on it. Perhaps this is why I have never been able to find any fresh-water shells at all during four summers' collecting. And also, as implied by the name, the water is so swift that no mud settles on the bed rock, which is always clean. Shells there must be, somewhere, for I have frequently found clusters of eggs adhering to the aquatic vegetation, which is very abundant; but although I have searched the Swiftwater to its source, and the other stream nearly as far, I have never been rewarded by finding any of our friends at home when I called. Last year my brother found one specimen each of an undetermined *Physa* and *Pisidium* in Paradise Valley, but as this was five miles from Pocono Manor I will not include them in the list.

With respect to land forms, however, a greater variety is encountered. The country is exceptionally rocky, the predominating rocks being red shale. The soil is very fertile, and in the woods the

ground is covered several inches deep with decaying leaves. Most of my collecting was done on hillsides having a northeastern exposure and at an elevation of about 1550 feet. The list of species follows:

Tebennophorus carolinensis Bosc.

Vitrea indentata Say.

Vitrea hammonis Ström.

Vitrea ferrea Morse.

Zonitoides arborea Say.

Euconulus chersinas polygyratus Pils. Found under decaying leaves far from the water. Rare.

Pyramidula cronkhitei catskillensis Pils.

Helicodiscus parallelus Say.

Polygyra albolabris Say. Exceedingly common in a man-hole on the pipe line which takes water from the Manor Spring to the Inn.

Polygyra dentifera Say.

Polygyra tridentata Say. Only the typical form. I saw no var. *juxtidentis* Pils.

Polygyra hirsuta Say. I was much surprised to find this species only under boards in fields exposed to the sun, and never in shady places at all.

Polygyra fraterna Say.

Bifidaria pentodon Say.

Cochlicopa lubrica Mull. Although I searched diligently I was never able to find this species alive, four dead specimens being the best I could do.

Succinea ovalis Say (*obliqua* Say). Another shell of which it is hard to obtain good specimens. The broken shells of this species are quite common.

Next year I hope to add some more names to this list.

Haverford, Montg. Co., Pa., Sept. 9, 1907.

SHELLS COLLECTED IN NORTHEASTERN MEXICO.

BY A. A. HINKLEY.

The species here listed were collected in December and January of the past winter. At Tampicò land and fresh-water forms were scarce and had it not been for the rich find in a windrow of river débris or drift the list would have been much smaller. This drift

was sifted through a small net and the siftings were worked over after returning home.

In both Panuco and Tamesi rivers there seemed to be very little molluscan life. Nearly all the living fresh-water forms listed from Tampico were taken from small ponds near LaBarra.

The mouth of the Panuco river is protected by jetties, on the gulf side of which most of the living marine species were taken. Not a specimen of any species was noticed on the river side of the jetties. Two days were spent on the beach and jetties, but no other effort was made to secure the marine forms.

In the vicinity of Valles the land shells were no more plentiful than about Tampico, but the Valles river was much richer in both species and individuals than the rivers at Tampico. With two exceptions the small streams seemed destitute of molluscan life.

It has been thought desirable to publish the full list because the shell fauna of this part of Mexico is but little known. No information has before been published on the marine forms between Texas and Vera Cruz; and the only data on the land shells of the region is contained in Pilsbry's paper on Rhoads' collection, which was made somewhat further inland, north of the localities here dealt with. It is likely that some of the old species hitherto credited to Texas were really taken at or near Tampico, such as *Helicina chrysocheila* and *Euglandina corneola*. The occurrence of *Adelopoma* so far north is remarkable.

The larger part of the species of this list were passed on by Dr. H. A. Pilsbry. Thanks are also due to Dr. Wm. H. Dall for assistance with some of the marine and fresh-water forms.

MARINE MOLLUSKS.

Spirula spirula (L.). Only broken ones taken.

Ostrea sp. Scattering young were on the jetties. In different places along the river and canal are beds of oyster shells exposed to view, overlaid by the surface soil. These shells are often dug out and burnt for lime.

Chama arcinella L., odd valves.

Pecten exasperatus Sby., odd and broken valves, common.

Pecten gibbus irradians Lam., odd valves.

Pecten nodosus Linn., broken valves.

Pecten raveneli Dall (?), one lower valve.

Mytilus hamatus Say, common on the jetties.

Mytilus exustus Linn., associated with *hamatus*, from which it is easily separated by its finer striæ and smaller size.

Modiola polita Verrill, 3 young specimens.

Congerina cochleata Kirby, found among clusters of *M. hamatus* as if seeking protection.

Arca floridana Conrad, odd and broken valves were plentiful.

Arca incongrua Say, 3 living specimens taken, odd valves common.

Arca occidentalis Ph., odd valves and pieces.

Phacoides pectinatus Gmel., odd and broken valves.

Cardita floridana Conrad, odd valves plentiful.

Cardium iscoardia Linn., odd and broken valves common.

Cardium magnum Born, odd valves common.

Cardium robustum Sol. (?), one young odd valve.

Dosinia discus Reeve, a few living ones taken, dead ones common.

Donax variabilis Say, one of the most plentiful species on the beach both living and dead.

Chione cancellata L., odd valves.

Chione intapurpurea Conrad, odd valves.

Tellina radiata Linn., odd valves.

Macoma constricta Brug., odd valves.

Iphigenia braziliana Lam., a few live ones taken.

Martesia cuneiformis Say. An old water-logged banana stalk thrown up by the tide, contained a number of nice specimens which were secured by the aid of a knife; also the shell-lined burrows of a *Teredo* were in this stalk.

Pinna sp., broken pieces.

Siphonaria lineolata Orbigny., numerous on the rocks of the jetties.

Crepidula aculeata Gmel., one poor specimen.

Cerithidea iostoma Pfr., a few dead specimens.

Terebra cinerea Gmelin. Living ones were common, mostly quite young, exposed to view as the waves receded, always turning head toward the current and immediately burying themselves in the sand.

Natica duplicata Say, one young specimen.

Natica brunnea Link, two dead and not mature.

Columbella obesa C. B. Adams, three found on a log thrown up by the tide.

Melongena melongena L., one specimen, dead and poor.

Purpura haemastoma Linn., common on the rocks of the jetty, no full-grown ones found.

Modulus modulus L., a few poor specimens noticed.

Littorina nebulosa Lam., var. *columellaris* Orbigny. A few were found on logs along the beach, but it is common on the jetties. Dr. Dall referred it to *L. flava*. Pilsbry says "*L. flava* is very thick inside the lip, exactly like *irrorata*. It resembles *nebulosa* in color, but is evidently a distinct species close to *irrorata*. I have never seen *L. flava* from north or west of Trinidad."

Littorina ziczac Dillwyn., very numerous on the jetties.

Cassis inflata Shaw, two young and dead.

Nerita præcognita C. B. Adams, three on the rocks of the jetty.

Neritina lineolata Lam. Plentiful in low places along the river and young ones were found on the gulf side of the jetties.

Neritina virginea L., a few were found with *lineolata* on one jetty.

Solarium granulatum Lam., two dead specimens.

Fissurella alternata Say, a few dead ones.

Vermicularia spirata Phil., young and dead.

Melampus coffea L., a few immature specimens.

Melampus floridanus Shuttl. Only a few specimens of this small species were found. Dr. Dall referred them to young *Tralia cingulata* Binney.

HELICINIDÆ.

Helicina chrysocheila Binney. Tampico and Valles. Scattering specimens were found over considerable territory. The species is very variable in color. Dead specimens were numerous in some places.

Helicina flavida Mke. This species was found only in the drift on the river bank, mostly dead.

Schasicheila hidalgoana Dall. El Abra, on the mountain side with *Opeas* and *Holospira*, only 3 taken.

HELICIDÆ.

Trichodiscina coactiliata Fér. Tampico, in drift.

Praticolella griseola Pfr. This was the most widely distributed species found. It seems to prefer the open fields and pastures.

Polygyra martensiana Pils. Tampico and Valles.

Polygyra oppilata Moric. Tampico and Valles.

Polygyra implicata Beck. Tampico.

Polygyra polita Pilsbry and Hinkley. Tampico.

Polygyra aulacomphala Pils. and Hinkley. Tampico.

Thysanophora conspurcatella Morel. El Abra, found with *Opeas*.

Thysanophora fischeri Pilsbry. Tampico, drift.

Thysanophora horni Gabb. Tampico, drift. "Not before known from the littoral region of the Gulf" (*Pilsbry*).

BULIMULIDÆ.

Bulimulus dealbatus Say. A few dead specimens noticed in the vicinity of Valles.

Bulimulus schiedeanus Pfr. One dead specimen, Tampico.

Drymæus multilineatus Say. Valles. A few dead ones with colors nearly as bright as in life. Pilsbry says "The specimens are almost exactly intermediate between *D. multilineatus* and *D. discrepans* Sowb., having the coloration of the latter except that the apex is dark bluish, as in *multilineatus*. There is no dark subsutural band."

(*To be concluded.*)

NOTES.

WE regret to record the death of Mr. Sloman Rous, of Brooklyn, N. Y., who died at sea on July 8th.

PUBLICATIONS RECEIVED.

THE MOLLUSCA OF THE PERSIAN GULF, GULF OF OMAN AND ARABIAN SEA, ETC.—Pt. II, Pelecypoda, by James Cosmo Melvill and Robert Standen. (Proc. Zoöl. Soc., London, 1906, pp. 783–848, pls. 53–56.)

In this part some 426 species are enumerated, of which 35 species are new. The richness of the fauna is dwelt upon, the total number of mollusca recorded from this area being 1618. The two parts constitute a valuable addition to our knowledge of mollusks of this region.

NEW AND CHARACTERISTIC SPECIES OF FOSSIL MOLLUSKS FROM THE OIL-BEARING TERTIARY FORMATIONS OF SOUTHERN CALIFORNIA, by Ralph Arnold. (Proc. U. S. Nat. Mus., XXXII, pp. 525–546, pls. 38–51, 1907.)

An interesting and profusely illustrated paper, in which 21 species and varieties are described as new. The geological formations represented are the Lower Miocene and Pliocene.

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No. 7.

EYES OF *HELICODISCUS LINEATUS*.

BY EDWARD S. MORSE.

Last year in studying the eyes of the smaller *Helices* I discovered that *Helicodiscus lineatus* was destitute of any pigmental organ functioning as an eye. A further examination with a higher power reveals apparently rudiments of a structure which may indicate the traces of an eye but not the slightest evidence of pigmentation was seen. The body and tentacles are a clear white.

In the volume on Mollusks in the Cambridge Natural History series the Rev. A. H. Cooke gives an interesting resumé of what is known of the molluscan eye. He says, "In land mollusca which live beneath the surface of the ground or in absolute darkness the eyes are generally more or less modified. Thus in *Testacella*, which usually burrows deeply in the soil but occasionally emerges into the open air, the eyes are very small, but distinct and pigmented. Our little *Cæcilianella acicula*, which is never seen above the surface, is altogether destitute of eyes. A species of *Zospeum*, a *Helix* and a *Bithynella* from dark caves in Carniola have suffered a similar loss."

The habits of *H. lineata* do not differ apparently from the other smaller species with which it is associated. I hope later to make some experiments in phototaxis.

CAPE COD NOTES.

BY. REV. HENRY W. WINKLEY.

The month of July was spent at Provincetown. August at the head of Buzzard's Bay. Unfortunately without a dredge, I can report only low tide results. The hook on the end of Cape Cod is, geologically speaking, a late formation, composed entirely of coarse sand with limited vegetation; hence not a paradise for land and fresh-water forms. I examined two fresh-water ponds but found no shells. On the land *Helix hortensis* has a colony. No banded forms were found. The lemon-yellow and a very light nearly transparent form are the chief colorings. The latter compared with the specimens of this species found by Mr. C. W. Johnson, at Chatham, are of the same color but more nearly transparent. While the Cape is not an absolute barrier between northern and southern forms, it is usually counted as a boundary. Provincetown being at the tip end, I was curious to know its fauna, and can pronounce it southern. *Bittium nigrum* and *Odostomia trifida*, *bisuturalis*, *fusca*, *seminuda*, and an undescribed species occur more or less abundantly. Both *Lunatia heros* and *Neverita duplicata* occur on the sand flats. *Litorinella minuta* is abundant but small. *Mya arenaria*, living in the clean sand, is abundant and the whitest shells I ever saw. *Venus mercenaria*, *Clidiophora gouldiana* and other forms show the general character of the fauna. Without attempting to make a detailed list, the forms are the same one would find south of the Cape. *Purpura lapillus*, living on the wharves, gave a few curiosities. Several specimens of deep yellow color in last year's growth had changed in this year's addition to pure white.

The outer side of Cape Cod is the home of *Ceronia arcata*. A visit to Highland Light at North Truro gave me a half hour at high tide, but I found a good set of the species and of fine large size. Odd valves of *Astarte castanea* show that it abounds. One or two specimens of *Cochlodesma leanum* demonstrate its home there.

A day spent at Woods Holl gave me an hour's collecting at low tide in the eel pond. The only record I would make would be one or two species of *Turbonilla* secured from a row boat. It is the first time I have ever collected any species of this genus in shallow water. My headquarters during August were at Wareham on an arm of

Buzzard's Bay, not quite on the Cape but near enough. As Pat says, "contagious" to it. The marine forms here are affected by brackish water. In one arm I could get *Ilyanassa obsoleta* in abundance, but failed to find *Bittium* and the *Odostomias*. In another arm with the fresh water they occur, but more or less eroded. A colony of fine specimens of *Paludestrina salsa* occurs in a pot hole on the marsh, and my daughter, Miss Ruth Winkley, located the same form sparingly among the flags along the border of the Agawam river at East Wareham. More should be said of the fresh-water collecting. The Agawam river is rich in specimens. *Unio complanatus* abundant and large, *Anodonta cataracta* occasional, and *Anodonta implicata* abundant and the finest specimens I have seen. My largest is $6\frac{1}{2}$ inches long and weighs $5\frac{1}{2}$ ounces. (Gould gives the largest as $4\frac{1}{2}$ inches long.) *Sphaerium secure* is very abundant. I obtained an unusually fine series of *Anodonta* beaks at this spot. On the whole I may say that a section of this stream is the richest in animal life I have ever seen in New England.

Ditches in the older cranberry bogs and small brooks abound in specimens of *Pisidium*, and *Amnicola limosa* and *porata* occur sparingly. Other fresh-water species occur like *Planorbis*, *Physa*, etc., but they are in better form earlier in the season, so I neglected them. I failed to find land shells. It has been an exceedingly dry season, and that may be the reason. I regret that I had no dredge with me. The good results from shore collecting would indicate the same from deeper waters.

A NEW SPECIES OF FLUMINICOLA.

BY H. A. PILSBRY.

The genus *Fluminicola* of Stimpson comprises globose, *Somatogyrrus*-like snails of streams and springs in and west of the Rocky Mountains. A list published by the writer in 1899¹ enumerates seven species and one subspecies. A new form was among the mollusks collected by the late Rev. Mr. Ashmun in Idaho, during the last year of his life.

¹ The NAUTILUS, XII, March, 1899, pp. 123, 124.

FLUMINICOLA MINUTISSIMA n. sp. Plate IX, fig. 1.

The shell is perforate, obliquely globose, thin, smooth, olivaceous yellowish, composed of three rapidly enlarging whorls, which are convex, and separated by an impressed suture, which becomes very deep in the last half-whorl. The spire is very short, the summit obtuse, the first whorl being nearly flat. The last whorl enlarges rapidly, and is well rounded peripherally, less so below; its last half descends rapidly. The aperture is quite oblique, nearly circular, but is angular above. The outer lip is thin, distinctly retracted at the upper insertion; the slightly concave columella is very strongly calloused within, flattened on the face. Below the umbilical perforation there is a narrow, crescentic, slightly excavated area, bounded outwardly by a low angle.

Alt. 1.5, diam. 1.75 mm.

Price Valley, Weiser Canyon, Washington Co., Idaho. Types no. 94273 A. N. S. P., collected by the Rev. E. H. Ashmun.

This species is smaller than any other of the genus, and is further distinguished by its very short spire and the rapid descent of the last half whorl. The columellar callus is unusually heavy for so small a shell.

SHELLS COLLECTED IN NORTHEASTERN MEXICO.

BY A. A. HINKLEY.

BULINULIDÆ.

Oxystyla princeps Brod. Tampico and Valles. Only dead specimens secured.

UROCOPTIDÆ.

Macroceramus mexicanus Martens. El Abra.

Holospira hinkleyi Pils. El Abra, on the mountain side with *Opeas*.

PUPILLIDÆ.

Strobilops hubbardi A. D. Brown. Tampico, scarce in drift.

Pupoides marginatus Say. Tampico, drift.

Bifidaria contracta Say. Tampico, drift, the most abundant species.

Bifidaria pellucida Pfr., var. *hordeacella* Pils. Tampico, drift, almost as numerous as *B. contracta*.

Bifidaria procera Gld. Tampico, found under pieces of wood in an open field, also in the drift.

Vertigo milium Gould. Tampico, two specimens in the drift.

ACHATINIDÆ.

Opeas gracile Hutton. El Abra, plentiful on the mountain side.

Opeas beckianum Pfr. Tampico, drift.

Opeas micra Orb. Tampico, drift.

Leptinaria tamaulipensis Pils. Tampico, scarce in the drift.

Leptinaria mexicana Pfeiffer. Tampico, drift.

Spiraxis tampicoensis Pils.¹ Tampico, drift, numerous.

Cecilioides (*Cæcilianopsis*) *jod* Pils. Tampico, drift.

OLEACINIDÆ.

Euglandina corneola Binn. Valles, a few dead ones.

Euglandina texasiana Pfr. Tampico and Valles, found about decaying logs, the most plentiful species of this family. Pilsbry says "Not *G. turris*. I find that they agree fully with Texas examples."

Euglandina sp. Valles.

Streptostyla gracilis Pils. Tampico and Valles, dead specimens.

Salasiella joaquinæ Strebel. El Abra, one specimen.

ZONITIDÆ.

Guppya elegans Strebel. Tampico, a few in the drift.

Zonitoides minuscula Binney. Tampico, numerous in the drift.

Zonitoides singleyana Pils. Tampico, common in the drift.

Zonitoides pentagyra Pils. Tampico, drift.

Zonitoides elegantula Pfr. Tampico, drift. This minute species was not plentiful. Pilsbry says "This is *Helix elegantula* Pfr., very badly figured as *Chanomphalus elegantulus*, by Strebel. Hitherto not known north of Vera Crnz. It has about the size and general appearance of a *Radiodiscus*, but the embryonic whorl is without spiral striæ."

LIMACIDÆ.

Agriolimax sp. undet. Valles, scarce.

ENDODONTIDÆ.

Pyramidula victoriana Pils. Tampico, in the drift, mostly immature examples.

¹ This species appears to belong to the genus *Cælostele*, which has not hitherto been known in America.—Ed.

SUCCINEIDÆ.

Succinea luteola Gould. In the vicinity of Tampico this species was numerous in a pasture; near Valles they were found along the wagon road, but more plentiful on a railroad embankment. They are richly colored, reddish with pale and dark streaks; some albino specimens were taken.

Succinea luteola Gld., var. *subtilis* Marts. Valles; only two examples taken.

Succinea sp. Tampico. Found in a loose pile of decaying vegetation and on the skull of a cow. The specimens taken are not quite as large as *S. luteola*, and are thinner.

VERONICELLIDÆ.

Veronicella sp. Valles; scarce, in shaded places.

CYCLOSTOMATIDÆ.

Adelopoma stolli Martens. Tampico. A single specimen found in the drift. Pilsbry says "This small species was described by Prof. Von Martens as *Diplommatina stolli*. This example is a little smaller than typical *stolli*, with weaker ribs and less swollen penult. whorl. The last whorl is gibbous above the columella, a character not noticed by Von Martens in his description of *stolli*. The number of riblets is about the same as in *stolli*, or perhaps somewhat greater. Until further examples are found the value of these differences from *stolli* is uncertain."

LYMNÆIDÆ.

Lymnæa cubensis Pfr. Valles. Taken from a pool by the roadside.

Planorbis cultratus Orb. Tampico. This small flat species was noticed in but one place; they were taken from the edge and under-side of a piece of board and other driftwood lying on the land near the edge of a small pond. A few *Seg. obstructa* were taken with them.

Planorbis liebmanni Dkr. Tampico and Valles; only dead specimens found in river debris.

Planorbis sp. Tampico. A very small form found in the drift.

Segmentina obstructa Morelet. Tampico and Valles. A common species in ponds; dead ones were numerous in places in the drift.

Physa mexicana Phil. Tampico and Valles. Young shells were numerous in some of the shallow pools, the larger ones being rather scarce.

Physa osculans Hald., var. *rhysa* Pils. Roadside pool near Valles with *Lym. cubensis*, the only place these two species were found. Differs from *P. mexicana* in having a more attenuate spire, one more whorl, and the body whorl is less inflated.

Physa sp. This is thicker than the *P. mexicana* and has the chestnut-colored callus within the outer lip, which in the larger examples shows at previous stages of growth.

Ancylus excentricus Morelet. Found on plants in Tamesi and Valles rivers; scarce; a fragile species.

VALVATIDÆ.

Valvata humeralis Say. Valles river.

AMNICOLIDÆ.

Cochliopa riograndensis Pils. & Ferr. Valles river. More elevated than *Valvata humeralis* and differs from it in having several colored spiral lines, giving it a striking resemblance to a small *Helix*. The operculum and teeth, examined by Dr. Pilsbry, show it to be correctly referred to *Cochliopa*. The aperture is angular above, thus differing from that of *Valvata*.

Amnicola guatemalensis C. & F. Tampico, on pieces of wood in ponds.

Amnicola tryoni Pilsbry. Tampico, drift; a smaller species than *guatemalensis*.

Potamopyrgus coronatus Pfr. Tamesi river, Tampico. The spines on the shoulder are well developed for so small a species.

Potamopyrgus coronatus texanus Pils. Valles river, only two examples secured, they do not show the spines.

Paludetrina tampicoensis Pils. & Hinkl. Tampico.

MELANIIDÆ.

Pachycheilus vallesi Hinkley. Plentiful in the Valles river.

UNIONIDÆ.

Unio tampicoensis Lea. Valles river.

Unio popei Lea. Valles river. Pilsbry says of these shells "I think they are correctly referred to *popei* Lea, as a variety. It differs from typical Texan *popei* in the dark nacre and the more distinct green rays. It is related also to *U. soledadensis* Crosse &

Fischer, but differs in the wide posterior end and the distinct rays. *U. soledadensis* was omitted by Simpson, evidently inadvertently. It should go in the *Synopsis* next to *U. popei*."

Unio sp. Valles river. The most plentiful *Unio* found. Dall referred it to *soledadensis*. Pilsbry says "A new species, related to *popei*, yet with some features of *U. medellinus*."

CYRENIDÆ.

Cyrena carolinensis Bosc. Panuco river, Tampico; found but few.

Cyrena germana Prime. Panuco river, Tampico. A single example, more compressed, and lighter colored, but possibly intergrades with *carolinensis*.

Pisidium singleyi Sterki. Valles river; Valles and drift of Panuco river, Tampico.

Eupera singleyi Pils. Valles river, Valles; and Tamesi river, Tampico.

MACTRIDÆ.

Mulinia lateralis Say. Panuco river.

PELSENEER'S TREATISE ON MOLLUSCA.

A TREATISE ON ZOOLOGY, edited by E. Ray Lankester, PART V, MOLLUSCA, by Paul Pelseeneer, London, 1906. This admirable book, of 355 pages, should be studied by every conchologist, although it is not quite elementary, and some fundamental knowledge of zoölogy is required to fully understand it. The text is well illustrated by 301 figures, partly diagrammatic, many of them from Prof. Lankester's article "Mollusca" in the ninth edition of the Encyclopedia Britannica, 1883. It is interesting to note the considerable changes of classification from Lankester's article to the present book. The editor of the NAUTILUS may permit to cite the main groups here, side by side:

LANKESTER, 1883.

Branch A. Glossophora,
 Class 1. Gastropoda.
 Br. *a.* Isopleura.
 Br. *b.* Anisopleura.
 Class 2. Scaphopoda.
 Class 3. Cephalopoda.
 Br. *a.* Pteropoda.
 Br. *b.* Siphonopoda.
 Branch B. Lipocephala.
 Class 1. Lamellibranchia.

PELSENEER, 1906.

Grade A. Isopleura.
 Class I. Amphineura.
 Grade B. Prorhipidoglossomorpha.
 Class I. Gastropoda.
 Class II. Scaphopoda.
 Class III. Lamellibranchia.
 Grade C. Siphonopoda.
 Class I. Cephalopoda.

It is seen that the PTEROPODA have disappeared as a division of higher order; they are ranged under two tribes of the sub-order *Tectibranchia*, order *Opisthobranchia*, of Gastropoda (pp. 170 and 173).

Many conchologists and zoölogists may be surprised to find the class Lamellibranchia¹ ranged under the same group with the Gastropoda and Scaphopoda, as in contrast to the *Isopleura* and the *Siphonopoda*. It still appears that the arrangement as adopted by Lankester and other zoölogists, is more natural: Lipocephala or Acephala, and Cephalophora. Not alone is the presence or absence of a head a distinguishing feature. On pp. 6-7 the author says: "the radula is characteristic of the phylum mollusca. It exists throughout the series . . . and is only absent in the most specialized types, in which it has evidently been lost, such as . . . the Lamellibranchs . . ." If it was lost in the latter there should be traces of it in the embryo, the more so since the embryonal and larval stages of at least many Lamellibranchia are of very well marked forms and existing as such through a long time and under various conditions. Also for other reasons it might appear that the Lamellibranchia are not a specialized or retrograde group, *e. g.*, from the Gastropoda or some primitive form near them, as must be inferred from Pelseneer's arrangement, but one primitively different. At any rate, I believe that they represent a group of decidedly inferior organization, and that their proper place is not in the same group with the Gastropoda, and between the latter and the Cephalopoda. The formation, and especially the functions of the ctenidia (branchiæ), are certainly significant;² and although the Lamellibranchiata have been decidedly, and as it seems, definitely separated from the Bryozoa, etc., the fact should not be overlooked that the branchiæ of the former have not only the same functions—principally nutritive—as the tentacles of the latter, but that, in many instances at least, the filaments are of similar formation, even to minute details. Something else might be said in this connection: it is the tendency of our day to found classification on a single organ, or organ system—rather than on the ensemble of the whole organization.

¹ On p. 197 the author says that the name *Scaphopoda* has been more generally used than *Solenococoncha*, for the sake of uniformity; for that same reason he might have adopted the name *Pelecypoda* in place of *Lamellibranchia* (better: *Lamellibranchiata*).

² Confer also Lankester l. c., pp. 684 and 685.

While studying the book I made some notes on minor items, and a few of them may be mentioned here.

A somewhat strange incongruity is shown in the synoptic tables at the head of each class, that of the Isopleura is carried down to families, those of Gastropoda and Lamellibranchia to sub-orders (the tribes of the former are omitted), that of Cephalopoda to tribes. In a general way, the grouping is carried down to genera, giving shorter or longer diagnoses of the latter where it seemed desirable.

Pp. 7 and 89-91. *Radula*. It should have been stated that the radula with its teeth is constantly formed anew, and advancing; while the teeth at the anterior end are becoming blunt and useless, and dropping off, new teeth at the posterior end are formed. The whole radula is renewed several and probably many times during the life of a snail. Also it should have been said that at least in some Gastropods and probably in many of them, the first teeth on the radula of the embryo are of a shape entirely different from those of the post-embryonal animal.

P. 18. "The otocysts . . . contain auditory granules or otolithes." But in closing the paragraph, the author says: "through them the creeping molluscs preserve their orientation and swimming molluscs their equilibrium." I would emphatically endorse the latter view, as against the otocysts being auditory organs, their structure as well as location, in most mollusca, seems to point in that direction.

P. 186. *Physidæ* . . . "with a narrow aperture." How does that agree with forms like our *Ph. ancillaria*, etc.? Nothing is said about the radula so very different from those of other Basommatophora.

P. 186. *Zonites* evidently comprises¹ *Zonites* s. str., *Zonitoides* + *Gastrodonta*, *Hyalina*, etc., (conf. p. 129, l. 4, *Zon. cellarius*); no mention is made of the differences of the genitalia, the foot, the radula, etc.

P. 187. *Helix* also is understood in the ancient, Pfeifferian sense, with "more than 4,000 species, a large number of sub-genera have been established," and some of them are cited. *Macroön* with its immense (probably meroblastic) ova might have been mentioned.

P. 188. *Pupa*, "shell cylindrical, dextral with obtuse summit . . ." This will fit most of the *Pupilla*, *Orcula*, etc.; but how about most of the *Torquilla*, *Bifidaria*, *Pupoides*, etc., which are evidently included?

¹ According to English-French conchological—not political—coalition.

P. 253. "There are 1,000 *Unionidæ*," pp. 267-268, "*Unio*, Retzius, shell thick, hinge toothed [sic!]. This genus includes more than a thousand species." Seven other genera are cited, *e. g.*, *Anodonta*, *Quadrula*, but *Lampsilis* is not, although mentioned on p. 240. (A few points on the morphology and anatomy of *Unionidæ* will be reviewed elsewhere). That the larval embryo of the *Mutelidæ* is a lasidium, might have been added.

P. 251. In fig. 228 A it is surprising to find the brush- or candle-like processes of the soft parts of a glochidium designated as "teeth of the shell" (S); the figure and explanation are taken over from Lankester's article (fig. 149 A), after Balfour.

These few criticisms on details do not mean to detract from the merits of the book in a general way. It cannot reasonably be expected that a man writing a book on a certain large group of animals be familiar with every detail.

V. STERKI.

FREDERICK STEARNS.

Frederick Stearns was born in 1832, and died in January of the present year. He was the founder of one of the greatest pharmaceutical establishments in this country. In 1887 Mr. Stearns retired from active business partly for the purpose of recuperating his health, which too strenuous devotion to business had somewhat impaired. The following years were devoted to travel abroad. Always observant and critical, he began as an amateur collector, and among his earliest achievements in this line is a magnificent collection of Japanese and Korean art objects, some 16,000 of which he donated to the Detroit Museum of Art—having a few years previously by his money and influence assisted in building the fine museum itself. Various smaller collections, such as coins, precious stones, etc., claimed his attention for a time. Then he took up conchology and devoted his time and money for several years to what was to him an absorbing diversion, and to science a work of great value. Over 10,000 species of shells classified and arranged in systematic order and catalogued are in the Detroit Museum as a monument to his activity in this line of human endeavor—almost a life-work in itself. His book, "*Marine Mollusks of Japan*," on which Dr. H. A. Pilsbry of Philadelphia collaborated, is a standard work based on his collection.

A considerable number of Japanese shells named after Mr. Stearns remind students of his labors on that fauna. Among invertebrates of other groups, he discovered *Scalpellum stearnsi*, a very large and handsome pedunculate barnacle.

SLOMAN ROUS.

Sloman Rous died at sea July 8, 1907. Mr. Rous had been ill for several months, and upon the advice of physicians resolved to return to his old home in South Africa at Port Elizabeth. He arrived at Southampton, and died when two days out from England on his way to Africa. He became very ill in the morning of July 8th, and expired in less than two hours.

Mr. Rous was born August 3, 1838, in England. He had lived the greater part of his active life in South Africa, where previous to the Boer war he accumulated a small fortune. The embargo, or what practically amounted to that, imposed by the Boers on imported articles ruined his business. He then came to the United States, which he had previously visited and, bringing with him a valuable collection of shells, opened a store in Jersey City, afterwards transferred to Brooklyn. He became well-known among collectors. His shells were desirable species, and the accuracy of his identifications was unquestioned. In South Africa he had devoted his leisure time to the gratification of his love of natural history. He made very important collections of South African insects, a large part of which were unfortunately destroyed, and he also contributed to a knowledge of the molluscan life of the Cape and the neighboring coasts. Many species of shells bear his name, and he almost or quite alone among dealers possessed specimens of the rare *Achatina* (*Cochlitoma*) *linteræ*, the locality of which is now deserted.

During the last five years of his life he was attached to the Department of Conchology in the American Museum of Natural History, New York. He was painstaking to the last degree, enthusiastic and discriminating. When disabled by his sickness—an asthmatic affection—he was engaged in studying the revision of the Amphibolidae, and was also at work revising the nomenclature of the collection of land shells.

Mr. Rous was a man distinctively strong and independent in thought, agreeable in address, and unfailingly courteous and considerate.—L. P. GRATACAP.

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No. 8.

ON A CYMATIUM NEW TO THE CALIFORNIAN FAUNA.

BY WM. H. DALL.

Having heard from Dr. R. H. Tremper that he had recently obtained from the fishermen of San Pedro, a species of *Cymatium* which could not be referred to any of the forms heretofore known from that region, he was requested to send the specimens for examination.

A careful study of it shows that it is different from any member of the group previously known from either coast of America, but so close to the Mediterranean "*Triton*" *corrugatus* Lamarck, that it seems impossible to separate it more than varietally.

Cymatium corrugatum var. *Tremperi* nov. Shell agreeing closely with *C. corrugatum* except in the following particulars: the peristracum in the latter is light colored, velvety, with the processes or hairs of a uniformly even length; in *Tremperi* it is blackish-brown, coarse, lamellose with, on the varices, strong, sparse, projecting hairs reaching 6 mm. in length. In all the specimens I have examined of the Mediterranean shell, there are, between the revolving primary ribs, numerous small subequal minor threads; while in *Tremperi* there are in the channels only one or two coarse, irregular, markedly larger riblets. The other differences are all apparently of an individual character. The shell measures: length 85; aperture, including the canal, 36; max. diam. 38 mm. There are five rather prominent axial ribs on the last whorl between the last pair of varices. The operculum is exactly like that of the Mediterranean form.

The animal was alive when captured, and was brought up from a depth of about 42 fathoms, bottom temperature about 51° Fahr. I have not been able to compare it with the *C. Krebsi* Mörch of the Antilles, which is said to have a short spire.

The discovery of this species adds another to the list of Mediterranean forms which reappear either directly or by closely related varieties or species, on the Pacific coast, attention to which had been called already by the late Dr. Philip Carpenter. Among them are :

California.	Mediterranean.
<i>Cymatium</i> var. <i>tremperi</i> ,	<i>C. corrugatum</i> ,
<i>Leptothyra</i> <i>carpenteri</i> ,	<i>L. sanguinea</i> ,
<i>Gibbula</i> <i>canfieldi</i> ,	<i>G. adriatica</i> ,
<i>Williamia</i> <i>peltoides</i> ,	<i>W. gussoni</i> ,
<i>Arctonchis</i> <i>borealis</i> ,	<i>A. celtica</i> ,
<i>Leda</i> <i>cuneata</i> ,	<i>L. cuneata</i> ,
<i>Crenella</i> <i>decussata</i> ,	<i>C. decussata</i> ,
<i>Verticordia</i> <i>novemcostata</i> ,	<i>V. novemcostata</i> ,
<i>Lima</i> <i>orientalis</i> ,	<i>L. tenera</i> ,
<i>Zirphæa</i> <i>crispata</i> ,	<i>Z. crispata</i> ,
<i>Platidia</i> <i>anomioides</i> ,	<i>P. anomiioides</i> .

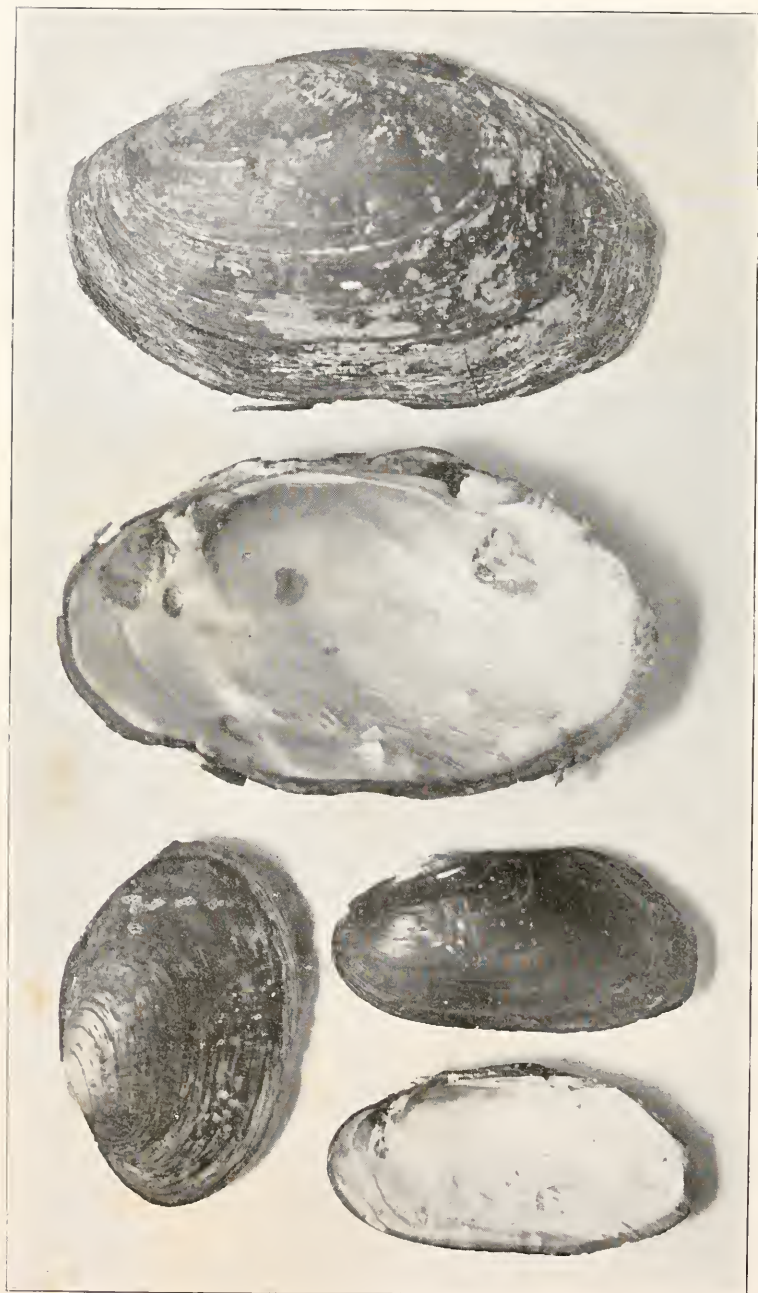
To these many more might be added without stretching the comparisons unduly.

A NEW MEXICAN MUSSEL, *LAMPSILIS FIMBRIATA*.

BY L. S. FRIERSON.

LAMPSILIS FIMBRIATA, n. sp.

Shell large, elliptical, thin, and compressed. Dorsal line incurved in front of the beaks. Anterior margin somewhat obtruded, and obtusely pointed or sharply elliptically curved. Basal margin nearly straight, occasionally slightly arcuated. Posterior margin broadly roundly biangular. Beaks low, and without sculpture. Posterior ridge elevated, rounded and obsolete. The greatest diameter of the shell being about the center of the ridge. Sides flattened, and generally somewhat constricted in the middle. Behind the posterior ridge, down the siphonal area extends a raised line, enclosing a triangular area (having its apex at the beak) which is sculptured



L. FIMBRIATA.

LAMPROLAIMA FIMBRIATA.

L. IRIDELLA.

with small pustules arranged in upcurved lines. Epidermis yellow, horn color, sometimes obsoletely rayed, on the posterior slope. The shell would seem to be nearly smooth, but in all the specimens seen there are numerous irregular, radial, pit-like impressions and concentric striae, and shallow sulci. The radial impressions or pits, extend through the shell, and are visible inside and out. Hinge ligament, stout and rather long. Muscle scars well marked, separate in front, confluent behind. Teeth stout, double in the left, and single in the right valve. Beak cavities shallow, with a row of muscle scars running downward, forward and onto the base of the cardinal tooth. Nacre white, flesh color or dark purple, very irregularly laid on, and very thin. Except in old shells, the prismatic structure extends far beyond the nacre, and the epidermal layer, in turn, extends still further.

Length 80, height 47, diameter 25 mm.

Habitat : Valles River.—Collected by MR. A. A. HINKLEY.

A cotype in coll. A. N. S. Phila., measures, length 81, height 51, diam. 22 mm.

The shell is not related very closely to any species that I know of. In fact I am undetermined whether to place it in *Lampsilis* or in *Nephronaias*. In the absence of any data regarding the animal, it is provisionally placed in *Lampsilis*. Mr. Hinkley informs me that it is near to, if not identical with an undescribed species labeled by Mr. Chas. F. Simpson as *Lampsilis salinasensis*, which however Mr. Simpson has not described, and which he informed me, he does not intend doing.

The prismatic layer is $\frac{3}{16}$ inch wide at the edge in some cases. This peculiarity accounts for the *pitting*, and numerous irregular sulcations being, it is evident not normal, but the result of numerous accidents which befall the extremely delicate edge of the shell.

Plate 12, two upper figures represent the type specimen; lower left-hand figure is a young shell.

THE GRAVID PERIODS OF UNIOS.

BY CHARLES H. CONNER.

About four years ago, I began to collect systematically data relative to the gravid periods of Unios. Some of the results are presented herewith, in the hope that they will be of interest.

The scene of most of my observations has been along the Delaware river and Big Timber creek, in the vicinity of Newbold and Washington Park, New Jersey.

All along the extensive flats there mussels abound, and their empty shells lie scattered along the banks in thousands.

For the purpose of these observations I have made it a point to patrol that section at low tide some time during every month of the year.

The work has been attended by many disadvantages, otherwise I should have been able to present a complete record of the matter.

The varying periods during which the glochidia are extruded by the various species, tends (so it appears to me) to effect their distribution; those spawning when fish are migrating, for instance, would have their distribution extended farther, or more rapidly than other species. Of the species hereabouts, *Unio complanatus* (Sol.), has given me the best results for the labor expended. My records show that they are gravid but once annually, from April-May to July-August, or, approximately, during four months of the year.

I have found *Lampsilis radiatus* (Gmelin), and *Unio nasutus* (Say) gravid all the year around. Both appear to spawn in June and November, if not also at other times. All the individuals do not spawn at the same time. On June 22, 1907, I found some *U. nasutus* with the gills half empty, and some still full.

Anodonta cataraeta (Say) is gravid about eight months in the year, the interim occurring during the warm period (May-October). I have found them gravid as late as May 27, and as early as October 13. I have found them spawning the latter part of December, to the early part of January* which indicates approximately, as is the case with *U. complanatus*, a gravid period of about four months.

I have had the good fortune to discover the use of the byssus also. I isolated a gravid specimen in an aquarium, and when the glochidia were extruded, using a magnifying glass, I discovered several of them, with the valve opened wide, hanging suspended by the byssus, from the *Anacharis canadensis* plants with which the aquarium was stocked.†

From further observations it appears that they hang thus sus-

* NAUTILUS, Vol. XIII, pp. 142.

† April 19, 1905, *Anodonta cataraeta*, Say.

pended, and when a passing fish touches them they fasten upon it by means of the hooks, and the glochidium is wrenched from its mooring. I observed frequently the sudden jump which my goldfish made, and I afterwards found glochidia attached to them.

A NEW ZONITOID SHELL FROM THE MIOCENE, FLORISSANT COLORADO.

BY T. D. A. COCKERELL.

Although fresh-water shells (*Lymnea*, *Planorbis* and *Sphærium*) are abundant in the Florissant shales, terrestrial species are extremely rare. In 1906 we found a species of *Omphalina*, in a fragmentary condition. The 1907 expedition has yielded a better-preserved specimen which is referred to *Vitrea*.

VITREA FAGALIS n. sp.

Diameter 7 mm.; with seven and a half closely coiled whorls, the first three not increasing at all, but having a uniform diameter of about 340 micromillimeters; the fourth barely larger, diam. about 357 m.; the fifth with diam. about 391 m.; the sixth twice as broad as the inner ones; the seventh much larger, diam. $1\frac{3}{4}$ mm. Last whorl very smooth and shining, not or hardly striate, but inner whorls delicately striate, with the exception of the apical whorl and a half, which are quite smooth. Spire gently convex, the sides regularly ascending to the apex. No internal lamellæ, so far as can be seen. One example, with reverse; on a slab with a leaf of *Fagus*, showing that it probably lived in the proximity of that tree.

This shell appears to be a *Paravitrea*, very close in all respects to *Vitrea andrewsæ*. In the number of whorls and absence of internal lamellæ, it is like *V. placentula*; but the whorls appear to be more closely coiled than in that species, and the radial sculpture is much closer and less regular.

The resemblance of the Florissant flora to that of the uplands of the southeastern states has already been noted; the discovery of *Vitrea fagalis*, and the previous finding of *Omphalina*, point in a similar direction.

A NEW CALIFORNIAN VERTIGO.

BY V. STERKI.

VERTIGO OCCIDENTALIS, n. sp. Plate XI, fig. 2.

Shell of the shape, size and appearance of a smaller *Vert. ovata* Say, but perforated; short ovate, chestnut-colored, transparent; slight impressions over the palatal folds, no crest, no callus inside; lamellæ and folds: parietal and angular close together, coherent, short, low, somewhat massive; columellar only indicated by a slight, angular projection; the two palatals quite small, short, the upper closer to the margin. Alt. 2 mill. Soft parts not seen.

Habitat: San Bernardino Mts., California, at alt. 7600 feet, collected in the summer of 1907, by Mr. S. S. Berry, one specimen.

It is rather inopportune to establish a species on a single specimen. But the one seen is mature, with no trace of a deformity, and with all its external resemblance to *V. ovata*, is evidently distinct. It has been carefully compared with many *ovata* from New Mexico, Arizona, California e. g., the Cuyamaca Mts. near San Diego, to Montana and Washington, etc. None of them was perforated, and the lamellæ and folds of *occidentalis* are different as to size, shape and location from those of *ovata*, even in immature specimens. It has been pointed out, years ago, that their location and shape are of more consequence than their mere presence or absence, at least in some forms.

NOTES.

Specimens of *Planorbis magnificus* Pilsbry have been kept alive in small aquaria at the National Museum for more than a year. Those which were adult when collected in 1906 (October) are all dead, apparently from old age, but before dying they left progeny now about six months old and one-third grown. It is therefore probable that the life of the species is about two years in length. The young have well-pigmented eyes, in the usual situation, but in the adult these have so degenerated that no trace of pigment or lens is visible in the living animal by transmitted light. Their favorite food is lily-pads, which they devour with great rapidity and on the lower surface of which they are most likely to be found.—W. H. DALL.

AMONG common "beach-stuff" from the Florida Keys the writer recently found a well-preserved sinistral specimen of *Marginella apicina* Menke, in excellent condition.—W. H. DALL.

MR. E. W. GIFFORD of Alameda, California, while collecting on the "planted" oyster beds of San Francisco Bay last July, found *Ilyanassa obsoleta* Say living in abundance. This is the first time it has been reported from the coast. The drills, *Urosalpinx cinereus*, which had previously been numerous, seemed to have all died, at least none living were found.—W. H. DALL.

MESSRS. FERRISS AND DANIELS have just returned from a collecting trip in Arizona. Several new and interesting species of *Sonorella* and *Ashmunella* are among the spoils. Some account of the expedition will be given next month.

HELIx HORTENSIS ON BASS ISLAND, ME.—While at Kennebunkport, Me., this summer, Mr. John B. Henderson discovered that Bass Island at Cape Porpoise was well stocked with *H. hortensis*, so I made a trip over there, and in about an hour collected seventy-five specimens. The ground and weeds were covered with young shells, but the adults were not so plentiful, as the field mice (?) are good collectors and make a specialty of fine large shells, and when they get through with them the shells are of very little use to the two-legged collector. Also saw a good many *Polygyra albolabris*, which had been eaten, but only found one alive. The specimens of *Helix hortensis* show the following variations:

Bands.		No. Specimens.
12345		19
12345	Transparent bands, Var. <i>arenicola</i> MacGill.	4
12300	Transparent bands, faint.	1
00345	Transparent bands, faint.	1
12345	(Two broken, almost gone).	1
00300	Band distinct.	3
00300	Band faint and broken, but in most of them the band is more or less transparent, some also show traces of other transparent bands.	35
00000	Yellow.	9
00000	Whitish.	2
Total		75

Band 3 is the one most persistent, and even in the shells which I have put down as 00000 yellow there is a very faint indication of it. In many of the 35 this band shows as a distinct patch back of the lip, with fragments at other places, while the balance of the band is more or less transparent as in *Var. arenicola*.

At Bar Harbor and on Bar Island, Frenchman's Bay, Mr. Henderson and I collected a number of *hortensis* all of which are 00000, and of a bright canary yellow.—GEO. H. CLAPP.

SHELLS OF LA JOLLA, CALIFORNIA.—Having read an article in the NAUTILUS by my friend Mr. Maxwell Smith about the conchology of La Jolla, Cal., I send a list of a few species which were not mentioned in Mr. Smith's article, but which I think are of interest in this connection, as one species has not been found in California before to my knowledge.

Zirphaea crispata.

Nettastomella darwinii.

Macoma secta.

Modiola recta.

Bryophila setosa. One collected by Mr E. P. Rawle of Philadelphia.

Leda hamata.

Yoldia cooperi.

Dentalium pretiosum.

Chromodoris porterae.

Hopkinsia rosacea.

Diaulula sandiegensis.

Triopha maculata.

Aplysia californica.

Circinaria transfuga.

Marginella regularis.

Eulima bistorta.

Eulima compacta.

Odostomia terricula.

Crucibulum imbricatum.

Crepidula excavata.

Acmaea pelta var. *nacelloides*.

Acmaea pelta.

Neritina sp. indet. (perhaps *picta*?) One specimen found by Mrs. Frank Pierce of Madison, Wis.

Leptothyra bacula.

Calliostoma gloriosum.

Ethalia invallata.

Haliotis cracherodii.

Nuttallina californica.

Octopus punctatus.

These species have all been collected by me except where otherwise noted. I was unable to compare the *Neritina* with any authentic specimens, but Mr. Kelsey, of San Diego, to whom I mentioned it, said that he had not heard of any *Neritina* found so far north, but thought it might be *N. picta*. The specimen of *Nuttallina californica* Reeve was a seven-valved individual.

JOSHUA L. BAILY, JR.

CHARLES AUSTIN DAYTON.—We regret to announce the death of Mr. C. A. Dayton who died at his residence in Brooklyn, N. Y., Nov. 7, 1907.

Mr. Dayton was a lifelong admirer and collector of shells, and was widely known through his correspondence with collectors. He was the first president of the Brooklyn Conchological Club and a regular attendant at its meetings until his recent illness confined him to his home. He possessed in high degree all those qualities which make the honored citizen and the esteemed friend.—SILAS C. WHEAT.

A CONTRIBUTION TO THE FAUNA OF THE COAST OF LOUISIANA.
—By L. R. Cary (Gulf Biologic Station Bull. No. 6, Cameron, La.).
A considerable list of mollusks is given, pp. 54–58.

BULLETIN OF THE BUFFALO SOCIETY OF NATURAL SCIENCES,
Vol. VIII, No. 6 (1907) contains an interesting historical sketch of the Society, illustrated with portraits of the presidents and other men of science prominent in its annals.

PROPOSALS FOR AN AMERICAN CONCHOLOGICAL SOCIETY.

The Brooklyn Conchological Club, which has maintained a successful organization for several years, proposed last May the formation of a society of national scope, appointing a committee to form a preliminary organization. This committee elected the following officers: President, Dr. H. A. Pilsbry, Philadelphia; Vice-President, Louis A. Gratacap, New York; Treasurer, Silas C. Wheat, Brooklyn; Secretary, Maxwell Smith, New York. These officers to serve until a permanent national organization can be formed.

At the International Zoölogical Congress held in Boston in August, those interested in mollusks held an impromptu meeting, and appointed the following committee to consider the question of organizing a society: Dr. W. H. Dall, Dr. H. A. Pilsbry, Elizabeth J. Letson, Silas C. Wheat, John Ritchie, Jr.

If sufficient interest in the proposed society is manifested a permanent organization will be effected. A general expression of the feeling among conchologists towards the project is desired.

Suggestions may be sent by those interested to Mr. Maxwell Smith, Secretary, 265 West 72d street, New York City, or to the Editors of *THE NAUTILUS*. It is hoped that some abstract of the responses may be received in time for publication in the issue of January 1st next.

Dr. Dall, Chairman of the Boston Committee, has drafted the following:

MEMORANDUM OF SUGGESTIONS FOR THE ORGANIZATION OF AN AMERICAN CONCHOLOGICAL ASSOCIATION OR SOCIETY.

NAME.—The AMERICAN Conchological Society would be better than "NATIONAL," as Mexican, Cuban, or Canadian members, whom it would be desirable to include, might object to the term "National" as excluding them.

OFFICE.—To promote intercourse between the students of Mollusca, recent or fossil, in North America, the Antilles and Hawaii; to encourage the study of Mollusks by meetings and publications, or other means suitable for the purpose, and to interest the general public in the study of shells.

OFFICERS.—The officers shall comprise a president, a vice-president for each section, a general secretary and a treasurer, and an executive council consisting of nine members.

MEMBERS.—The membership of the Society shall be divided into the follow-

ing classes: Patrons, life members, active annual members, associates, and corresponding members. A limited number of honorary corresponding members may be authorized by the council if deemed desirable.

QUALIFICATIONS.—A patron shall be a donor to the Society of any sum exceeding the total of two life-membership fees, and shall be entitled to all publications of the Society and to receive gratis any periodical which may be distributed, as its organ, to the members by the Society. A life membership may be secured by the payment to the Society's treasurer of the sum of one hundred dollars; active membership by the annual payment in advance of the sum of five dollars;¹ associate membership by the annual payment in advance of one dollar and a half by American associates and two dollars by foreign associates or corresponding members. Honorary members may be relieved of payment at the time of election by the vote of the executive council.

All members shall be nominated to the council by the application of any three members or associates in good standing through the secretary, and shall be elected by a majority vote of the council, but no election shall be deemed effective until the treasurer has received the first annual subscription from the nominee, and the publications of the Society shall not be sent to any member subsequently, more than two months in arrears. All membership fees shall be due and payable at the beginning of the year, and no subscription for the benefit of any member or associate to the organ of the society shall be made by the treasurer until this annual fee shall have been paid.

SECTIONS.—To facilitate local intercourse by meetings or otherwise, the Society may establish sections for the members of the Atlantic coast, Pacific coast and Mississippi valley (or other) regions. Meetings within each sectional area may be arranged by the local sectional vice-president, and the members of the section may elect temporary officers, except the vice-president when present, and by a majority vote assess such local subscriptions as may be needed to carry on local work in addition to the regular annual fees.

NOMINATIONS AND ELECTIONS.—Owing to the scattered distribution of the membership, voting may be by ballot mailed to the secretary, who shall announce the result through the organ of the Society, in the number next following the limit fixed for counting the vote, but no votes by proxy shall be accepted.

Nominations for officers may be made by any three members or associates, so as to be announced at least one month before the annual election in the Society's organ. Nominations for membership may be made at any time, but at least one month before they are to be acted upon.

The secretary, treasurer and members of the executive council shall be active or life members, and serve until the election of their successors. Elections shall be annual. The president, vice-presidents, secretary and treasurer shall

¹ Members of the Brooklyn Club and some others think the annual dues would better be fixed at two or three dollars.

be ex-officio members of the Council. The term of office for the members of the Council (not ex-officio) shall be three years, but three members shall retire each year, and of the nine members elected to the Council at the first election three shall serve one year, three two years, and three the full term, the individuals to be determined by lot; after which three members shall be elected annually.

THE COUNCIL.—The Council shall conduct the business of the Society, elect members, control expenditures, audit the treasurer's accounts, prescribe the duties of Secretary and Treasurer, make rules or by-laws to carry out the details of the organization of the Society, and shall annually report to the Society at least one month before the annual election. All new members or associates shall be elected by a majority vote of the Council, not less than five members constituting a quorum.

ACTIVE MEMBERS.—Active members shall be elected from those persons actively engaged in research, the collection, or the study of the Mollusca, and their qualifications shall be stated in the nomination papers. Associates may be any one of good character interested in the general subject or the study of natural history. Corresponding members shall be residents of foreign countries.

OFFICIAL ORGAN.—The Council may select a periodical, not issued by the Society, as its official organ, and may from the annual fees pay such subscription for the several members and associates as may be arranged for with the proprietors of such periodical.

AMENDMENTS TO THE CONSTITUTION AND BY-LAWS.—The constitution may be amended by a majority vote of the life and active members at any annual meeting, provided notice of the proposed amendment shall have been given in the official organ at least three months previously. Amendments to the by-laws may be made at any meeting of the Council called for the purpose, at least one month's notice having been given to the members of the Council.

PERMANENT FUNDS AND EXPENDITURES.—The sums paid in by patrons and life members shall be invested and constitute a permanent fund, of which the interest only shall be available for expenses as directed by the Council. All expenditures must be authorized and all investments approved by a vote of the Council, which shall have the Treasurer's accounts annually audited, the result to be included in the annual report to the Society.

LOSS OF MEMBERSHIP.—Any member or associate two months in default in his annual subscription shall be notified by the Secretary, and any member or associate who shall be over one year in arrears shall, *ipso facto*, lose membership; provided that, on a majority vote of the Council and payment of all arrearages, such member or associate may be reinstated without a formal re-election.

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No. 9.

POMATIOPSIS ROBUSTA N. SP.

BY BRYANT WALKER.

Shell ovate-conic, perforate, smooth and shining, lines of growth subobsolete; light greenish-yellow becoming lighter towards the apex; spire elevated, apex blunt, the initial whorl being perceptibly flattened. Whorls $5\frac{1}{2}$, convex, with a well impressed suture, body whorl large and inflated. Aperture ovate, narrow above and well rounded below, between one-third and one-half of the length of the shell; peritreme continuous and adnate to the parietal wall above the perforation; lip sharp.

Alt. 6, diam. $3\frac{1}{2}$ mm.

Jackson Lake, Wyoming.

Type in the collection of A. A. Hinkley, Du Bois, Ill.

Although only a single specimen of this species was found, it is so obviously distinct from any of the known species of the genus, that I do not hesitate to describe it.

It is a much stouter shell than *P. hinkleyi* and differs from both that and *californica* in the less convex whorls and less impressed suture. In these particulars it resembles more *P. lapidaria*, but differs from that entirely in shape. The narrow perforation and sharp lip as well as the general contour easily separate it from *P. cincinnatiensis*.



A COLLECTING TRIP AT NORTHPORT, N. Y.

BY WM. H. WEEKS, JR.

It was my good fortune to have a vacation during the month of October, and I decided to go to Northport, in search of shells. Northport is situated on a fine harbor on the north shore of Long Island, some forty miles from New York City. The conchologist here has a fine field before him for work, and if not easily discouraged, shore-collecting will yield good results. It usually means however long tramps each day of some five to ten miles. I expected to use the dredge but could not make satisfactory arrangements. It is here that the scallop (*Pecten borealis*) abounds, but this year only small quantities have been brought in by fishermen, and the much-prized red variety is decidedly scarce.

Where I had found some five years ago countless numbers of *Crepidula convexa* on the beach not a specimen was to be seen, but a few were gathered at low tide from dead specimens of *Litorina littorea* and *Nassa obsoleta*. *Mya arenaria* were everywhere on the beach in fine order, and also many *Ensis directus*. Usually one has to dig for them. *Lævicardium mortoni* were found in small colonies and seemed to be larger than usual. Numerous odd valves of *Astarte undulata* were taken at low tide. It is evidently a deep-water species. No search was made for land shells. The following is a list of species obtained :

- Ostrea virginica* Gmel., cultivated extensively.
- Anomia simplex* Orb., abundant.
- Pecten gibbus* var. *borealis* Say, fairly common.
- Mytilus edulis* Linn., abundant.
- Modiolus modiolus* Linn., scarce.
- Modiolus demissa* var. *plicatula* Lam., abundant.
- Arca transversa* Say, abundant.
- Arca pexata* Say, abundant.
- Astarte undata* Gld., odd valves.
- Lævicardium mortoni* Contr., fairly common.
- Venus mercenaria* L., abundant.
- Petricola pholadiformis* Lam., fairly common.
- Tellina tenera* Say, one specimen.
- Macoma balthica* Linn., scarce.

Ensis directus Conr., abundant.
Spisula solidissima Dillw., fairly common.
Mulinia lateralis Say, scarce.
Lyonsia hyalina Conr., scarce.
Mya arenaria Linn., common.
Busycon canaliculata Say, fairly common.
Busycon carica Gmel., fairly common.
Nassa trivittata Say, fairly common.
Nassa obsoleta Say, very abundant.
Nassa vibex Say, scarce.
Astyris lunata Say, scarce.
Eupleura caudata Say, scarce.
Urosalpinx cinereus Say, common.
Odostomia trifida Totten, scarce.
Bittium nigrum Stimp, common.
Litorina rudis Donovan., common.
Litorina littorea Linn., very common.
Crepidula fornicata Linn., common.
Crepidula plana Say, common.
Crepidula convexa Say, scarce.
Neverita duplicata Say, fairly common.
Chaetopleura apiculata Say, scarce (usually on oysters).

A LIST OF THE LAND SHELLS OF LEE COUNTY, FLORIDA.

BY E. G. VANATTA.

The following species were collected in Lee County, Florida, by Mr. Clarence B. Moore. The smaller forms were picked from leaf-mould sent in bags, each with the exact locality carefully marked on it.

Practically nothing has been known hitherto of the land-snail fauna between Key Marco and Cape Florida, the Ten Thousand Island region being accessible only to the collector cruising in his own boat.

It is interesting to note the occurrence of *Bifidaria rhoadsi* Pils. and *Vertigo variolosa* Gld. on the west coast of Florida; also that many of the shells of *Zonitoides minuscula* Binn. have internal

laminæ or teeth. The use of the name *Euglandina rosea* Fér. instead of *Glandina truncata* has been explained by Dr. Pilsbry in the last number of the Manual of Conchology, p. 191. All the specimens listed are in the collection of the Academy of Natural Sciences of Philadelphia.

Blue Hill Id., near Goodland Point, Marco Key.

Truncatella bilabiata Pfr.

Thysanophora selenina Gld.

Polygyra cereolus f. *carpenteriana* Bld.

Polygyra uvulifera Shutt.

Drymæus multilineatus Say.

Euglandina rosea Fer.

Euglandina rosea parallela Binn.

Buttonwood Key.

Polygyra cereolus f. *carpenteriana* Bld.

Bifidaria p. *hordeacella* Pils.

Bifidaria rupicola Say.

Zonitoides singleyana Pils.

Chokoloskee Key.

Pupoides modicus Gld.

Bifidaria rupicola Say.

Zonitoides minuscula Binn.

Dismal Key.

Truncatella bilabiata Pfr.

Helicina orbiculata Say.

Thysanophora plagiptycha Shutt.

Polygyra cereolus f. *carpenteriana* Bld.

Strobilops hubbardi A. D. Brown.

Pupoides modicus Gld.

Bifidaria rhoadsi Pils.

Bifidaria p. *hordeacella* Pils.

Bifidaria rupicola Say.

Microceramus floridanus Pils.

Euglandina rosea parallela Binn.

Vitrea dalliana 'Simpson' Pilsbry.

Guppya gundlachi Pfr.

Zonitoides minuscula Binn.

Zonitoides singleyana Pils.

Fakahatchee Key.

Truncatella bilabiata Pfr.
Helicina orbiculata Say.
Thysanophora selenina Gld.
Polygyra cereolus f. *carpenteriana* Bld.
Pupoides modicus Gld.
Bifidaria rupicola Say.
Microceramus floridanus Pils? (young).
Drymæus (young *multilineatus* Say?)
Drymæus dominicus Rve.
Euglandina rosea Fer.
Euglandina rosea parallela Binn.
Vitrea dalliana 'Simp.' Pils.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.

Georgia Fruit Company's land, S. of Marco.

Praticolella jejuna Say.
Vitrea dalliana 'Simp.' Pils.
Guppya gundlachi Pfr.

Gilberts (near Matanzas Pass).

Polygyra cereolus f. *carpenteriana* Bld.
Pupoides modicus Gld.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Vitrea dalliana 'Simp.' Pils.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.
Zonitoides singleyana Pils.

Goodland Point, Marco Key.

Polygyra c. f. carpenteriana Bld.
Bifidaria p. hordeacella Pils.
Euglandina rosea Fer. (near *parallela* Binn.)
Zonitoides minuscula Binn.
Succinea floridana Pils.

Little Marco.

Truncatella caribæensis succinea C. B. Ad.
Truncatella bilabiata Pfr.

Helicina orbiculata Say.
Helicina orbiculata var. *clappi* Pils. Mss.
Thysanophora plagiptycha Shutt.
Polygyra cereolus f. *carpenteriana* Bld.
Polygyra uvulifera Shutt.
Bifidaria contracta Say.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Vertigo variolosa Gld.
Microceramus floridanus Pils.
Euglandina r. parallela Binn.
Vitrea indentata Say.
Vitrea dalliana 'Simp' Pils.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.
Zonitoides singleyana Pils.

Marco, N. end of Marco Key

Polygyra cereolus f. *carpenteriana* Bld.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Euglandina rosea Fer.
Euglandina rosea parallela Binn.
Vitrea dalliana 'Simp.' Pils.
Guppya gundlachi Pfr.

Mound Key, Estero Bay.

Truncatella caribæensis succinea C. B. Ad.
Truncatella bilabiata Pfr.
Helicina orbiculata Say.
Thysanophora plagiptycha Shutt.
Polygyra cereolus f. *carpenteriana* Bld.
Pupoides modicus Gld.
Bifidaria contracta Say.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Euglandina rosea parallela Binn.
Euglandina rosea minor Binn.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.
Succinea floridana Pils.

Nameless Key (Mr. Addison's) two miles east of Marco.

Helicina orbiculata Say.
Thysanophora selenina Gld.
Polygyra cereolus f. *carpenteriana* Bld.
Pupoides modicus Gld.
Bifidaria contracta Say.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Microceramus floridanus Pils.
Euglandina rosea parallela Binn.
Vitrea dalliana 'Simp' Pils.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.
Zonitoides singleyana Pils.

Near Punta Rassa.

Truncatella bilabiata Pfr.
Polygyra cereolus f. *volvoxis* Pfr.
Euglandina rosea parallela Binn.

Aboriginal shell-heap about one mile east of St. James, Pine Island.

Truncatella clathrus Lowe.
Truncatella caribæensis 'Sby.' Rve.
Truncatella caribæensis succinea C. B. Ad.
Truncatella bilabiata Pfr.
Praticolella jejuna Say.
Polygyra cereolus f. *volvoxis* Pfr.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.
Zonitoides singleyana Pils.

Pine land, N. W. end of Pine Island.

Helicina orbiculata Say.
Bifidaria contracta Say.
Bifidaria p. hordeacella Pils.
Bifidaria rupicola Say.
Euglandina rosea Fer. near var. *parallela* Binn.
Guppya gundlachi Pfr.
Zonitoides minuscula Binn.

N. E. end Pine Island, Lee Co., Florida.

Euglandina rosea parallela Binn.

Russell's Key.

Helicina orbiculata Say.

Helicina orbiculata var. *clappi* Pils. Mss.

Thysanophora selenina Gld.

Thysanophora plagiptycha Shutt.

Polygyra cereolus f. *carpenteriana* Bld.

Pupoides modicus Gld.

Bifidaria p. hordeacella Pils.

Bifidaria rupicola Say.

Microceramus floridanus Pils.

Euglandina rosea parallela Binn.

Guppya gundlachi Pfr.

Zonitoides arborea Say.

Zonitoides singleyana Pils.

Turner Place, Turner River (a key near Chokoloskee).

Truncatella bilabiata Pfr.

Polygyra cereolus f. *carpenteriana* Bld.

Polygyra uvulifera Shutt.

Bifidaria rupicola Say.

Microceramus floridanus Pils.

Euglandina rosea parallela Binn.

Vitrea indentata Say.

Zonitoides minuscula Binn.

About five miles up Whitney River (mainland).

Polygyra cereolus f. *carpenteriana* Bld.

Bifidaria rupicola Say.

Euglandina rosea parallela Binn.

Guppya gundlachi Pfr.

Wiggins' Key, Sandfly Pass.

Euglandina rosea parallela Binn.

Lossman's Key.

Euglandina rosea minor Binn.

CANCELLARIA OBTUSA DESH.

BY SLOMAN ROUS.

Among some shells handed to me by my friend Mr. D. W. Ferguson, of Brooklyn, is a specimen of *Cancellaria obtusa* Desh. Tryon writing in 1885 says (Man. of Conch., Vol. VII, p. 68): "The unique specimen formed part of the Cumingian collection. Hab. unknown." As far as I am aware no other specimen has since been recorded, and it seems worth while to note the appearance of another specimen and at the same time to amplify the somewhat meager description given in the Manual.

The specimen is unfortunately what is called a dead shell but it retains its color and is perfect, its principal imperfection being a worm groove in the aperture, but this in no way detracts from showing its characteristics and the species can be perfectly described from the specimen.

Spire much depressed, regularly spirally costate, the ridges flattened, the intervening grooves about half the width of the ridges, growth lines somewhat obsolete, but deeply pitted where they cross the spiral grooves; light yellowish-brown; whorls three; rather narrowly umbilicate, columellar plications three, the inferior somewhat obsolete, upper part of aperture very heavily calloused, aperture white. Lon. 24, lat. 18 mm. Hab. Panama.

Mr. Ferguson received this specimen with a number of other species from Mr. McNeill, well known as a collector of shells of Central America, Panama, etc. All were labeled Panama, and all the other species were undoubtedly Panama shells. I think there is but little doubt but that this habitat will prove correct.

NOTES.

MUREX CARPENTERI, FORM ALBA.—During the past year the fishermen of Newport, Orange County, California, have brought up a number of specimens of *Murex carpenteri* Dall, in their nets. Most of them are the ordinary form, but among them are two or three specimens of a pure white color, showing little or none of the usual brownish coloration so characteristic of the species. This is a really beautiful variation, but as yet it seems to be very rare. Ac-

according to the usual custom, this form may be referred to as the form or variety *alba*.—S. S. BERRY.

TRITON GIBBOSUS BROD., IN CALIFORNIA.—Ralph Arnold in The Paleontology and Stratigraphy of San Pedro, quotes the range of the living *T. gibbosus* as West Tropical America and Panama. At this time Dr. Dall supposed that a single example from San Pedro Bay had been washed from the fossil beds on the beach. Another writer reports the species from San Pedro Bay (see NAUTILUS, Vol. VII, p. 75). At the time I brought the La Jolla material together (NAUTILUS, September, 1907), three specimens were secured by Miss Mary A. Williams, Joshua L. Baily and myself. These were not included in the L. J. list, as at the time the identity was doubtful. The species can now safely rank in the fauna of the state.—MAXWELL SMITH.

SHELLS OF THE LAKE REGION OF MAINE.—The following mollusks were collected at Capens, Deer Island, Moosehead Lake, during July, 1907: *Polygyra fraterna* Say, *P. albolabris* Say, *P. sayana* Pils., *P. dentifera* Binn., *Vitrea hammonis* Ström., *Euconulus fulvus* Müll., *Zonitoides arborea* Say, *Pyramidula alternata* Say, *P. cronkhitei anthonyi* Pils., *Sphyradium edentulum* Drap., *Succinea ovalis totteniana* Lea, *Philomycus carolinensis* Bosc., and *Planorbis bicarinatus* Say.—C. W. JOHNSON.

MOLLUSCA OF LA JOLLA, CALIFORNIA.—To the lists which have appeared in the NAUTILUS, the following nudibranchs may be added:

Chromodoris macfarlandi Ckll. Forms a distinct subgenus or genus.

Chromodoris californiensis Bergh (*universitatis* Ckll.).

Archidoris montereyensis Cooper (?). Specimens immature.

Cadlina flavomaculata McFarl.

Cadlina marginata McFarl. (?). Specimens small.

Doridopsis nigromaculata C. & E. (*vidua* Bergh, var. (?).

Thecacera velox Ckll.

Several others have been found at San Pedro and San Diego, and, therefore, may be expected at La Jolla.

In the Journal of Malacology, 1905, p. 42, is given a brief account of a new *Triopha* from San Pedro. No specific name was offered, because the notes on the external characters had been mislaid.

These have now been recovered, and the animal may take the name originally given in MS., *Triopha aurantiaca*. It is close to *T. carpenteri* Stearns, in external characters, but instead of being white it is orange, with the appendages tipped with vermilion.—T. D. A. COCKERELL.

HENRY VENDRYES.

Mr. Henry Vendryes, well known to students of the Jamaican fauna, died at Kingston, Jamaica, Nov. 20, 1907, in his 86th year.

Mr. Vendryes was of French extraction, his father having served with Napoleon, and was born on the island Oct. 30, 1822. He became a student of law with Donald Campbell, a noted solicitor of that day. After making a temporary experiment as a business man, he soon returned to his first choice. In 1879 he was appointed an advocate of the Supreme Court, and was offered but declined the position of resident magistrate on the island. He distinguished himself in private practice of the law, and was for a time the editor of a local paper now extinct, the "Colonial Standard." His accomplishments in music were exceptional, but it is as a conchologist and the friend of conchological students interested in the Jamaican fauna that the readers of the NAUTILUS will chiefly remember him. He contributed largely to the cabinets of Adams, Chitty, Bland, Guppy and others as their publications show, and was most courteous and generous in extending aid to all who were interested in his special science. He leaves a large family connection. He suffered serious financial losses by the Kingston earthquake, and his uniquely complete collection of Jamaican shells and fossils has been offered for sale, particulars of which can be learned from his late partner and son-in-law, Mr. R. W. Bryant, of Kingston. W. H. DALL.

SOME PERSONAL RECOLLECTIONS OF HENRY VENDRYES.

BY J. B. HENDERSON, JR.

The news of Henry Vendryes' death in Kingston, Jamaica, a few weeks ago has awakened many pleasant memories of his personality. On our collecting trips to Jamaica, Mr. Simpson and I always paid our respects to this veteran conchologist, and we passed many pleas-

ant hours in his "shell room" inspecting his large collections and enjoying his generous hospitality.

Mr. Vendryes was then—ten years ago—an old man carrying somewhat unsteadily the weight of seventy-five years, but he radiated about him the indefinable charm of the gentleman of the old school. He talked freely of days in the field with C. B. Adams, Chitty and Gloyne, those forefathers of Jamaican conchology, and the spirit of their work and methods remained with him, for he evolved with difficulty from that conchological era when every roundish land shell was a *Helix*, and every marine shell with a long canal stood firmly on the name of *Fusus*.

The large collections which he brought together were almost wholly made up of Jamaican and Haitian forms both marine and land. They were large and of undoubted scientific value, although their beauty was marred by the presence of too many dead and worn specimens of the commoner species which he seemingly lacked the courage to throw away. His shells were mounted upon glass slides the specimens fixed by cement and the names and localities painted upon the glass in white. What appeared to be a most unsatisfactory cabinet method he assured me was made necessary in that tropical climate by the swarms of insect pests which would relish paper trays and labels.

Owing to the lack of modern titles in his library Mr. Vendryes was much handicapped in his literary labors. He acknowledged the necessity of anatomical work and fully approved of the more modern methods of biological research, but before such a task as applied by himself to his collections he sank back exhausted.

Notwithstanding such discouragements Mr. Vendryes published an excellent list of Jamaica shells which is to-day the best we have, and he also had in preparation the great undertaking of a monograph of the most exhaustive kind, of the Jamaican fauna. He gave me a section of this MS of literally hundreds of pages of closely written (in his own hand) observations, critical notes, descriptions, synonymy, etc., and asked me to find a publisher for it in the United States. The preparation of this unpublished monograph involving as it must have done an enormous amount of physical as well as mental effort, was, after all, a labor of love, and from the way he handled the MS it was apparent how he loved the monument he was with such infinite pains building for himself.

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FEBRUARY, 1908.

No. 10.

HYGROMIA HISPIDA (LINNÆUS) IN MAINE.

BY N. W. LERMOND.

In 1904 I found a snail considerably smaller in size than *Polygyra fraterna* Say, and very numerous on walls of old lime quarries, on wooden sidewalks and on the under sides of rocks from the lime quarries at Rockland, Knox County, Maine. Specimens sent Dr. Pilsbry for identification were pronounced by him *Hygromia hispida* (Linn.), and the first record for this species for the state of Maine.

In his 1898 list of "Land Shells of America North of Mexico," on page 3, Prof. Pilsbry gives *Hygromia hispida* (Linn.) as found at Quebec and Levis, Quebec, Canada—"a species of northern Europe, imported." In 1905 I found them quite as plentiful in and about old lime quarries at Thomaston, and in 1906 collected them in a garden in the same town under cabbage plants. They literally "swarmed" on the ground and on the under side of the cabbage heads. This garden is on the banks of "Mill River," and near a lime kiln.

This season I found them just as numerous—and they are by far the most abundant species in this locality—in the Rockland and Thomaston localities, but have not as yet found them elsewhere in the county, although they quite likely are already established in the lime quarries of Camden and Rockport.

ON CERTAIN IMMATURE ANCULOSE.

BY BRYANT WALKER.

Anculosa prærosa was described by Say in 1824 from specimens collected at the falls of the Ohio. In the following year he described a second species from the north fork of the Holston River in Virginia as *A. subglobosa*.

In 1838 Dr. Lea described a very small bicarinate species from Cincinnati as *A. cincinnatiensis*, and, in 1845, another species from "Tennessee and Tuscaloosa, Ala.," as *A. tintinnabulum*.

Tryon in his preliminary "Synonymy of the Strepomatidae" (1865) stated that *cincinnatiensis* was "undoubtedly the quite young of *prærosa*," and placed *tintinnabulum* as a variety under *subglobosa*. He considered *A. virgata* Lea, a small, smooth, rounded form, to be the young of *tintinnabulum* and *A. globula* Lea, a very similar but more globose shell, the immature form of *subglobosa*.

In 1871, Dr. James Lewis published a paper in the American Journal of Conchology (VI, p. 216) on the shells of the Holston River, in which he identified a small bicarinate form from that river as *A. cincinnatiensis*, and, by a series of specimens graded in size, satisfied himself that this form was the young of Lea's *tintinnabulum*.

He further states that "some of the varieties (so-called) of *Anculosa prærosa* have bicarinate young, but their *forms* are such that when the dimensions of Mr. Lea's typical *cincinnatiensis* (diameter .16 inch) they *do not exactly*, but only *approximately*, correspond thereto, and therefore must yield to the claims of *tintinnabulum*." Dr. Lewis did not specify the peculiar characteristics of the young of *A. prærosa*, as distinguished from the young of *tintinnabulum*, beyond stating that the species is extremely variable and that "in one variety carinæ are scarcely discernible in the smallest specimens. In others there are traces of carinæ upon shells of nearly or quite $\frac{1}{4}$ inch in diameter."

In regard to *A. subglobosa* he described the young as "smooth, shining, depressed, subglobose, with a somewhat pointed, elevated apex," and states that in his numerous series of that species "none are carinate, nor can I find any evidence by which I might identify *subglobosa* with *tintinnabulum*."

His conclusion therefore was that Lea's *cincinnatiensis* was the



1.



2.



7.



9.



8.



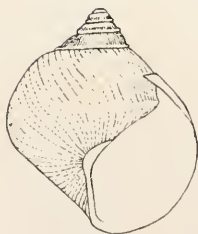
3.



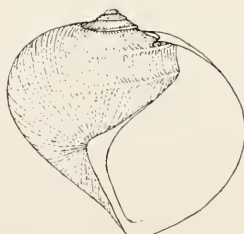
5.



10.



4.



6.



11.

very young of a valid species distinct from both *prærosa* and *subglobosa*, of which *A. tintinnabulum* was the adult form.

Subsequently Tryon reviewed Dr. Lewis' paper (*Am. Jour. of Con.*, VII, p. 86) and, without discussing at all the facts on which the latter had based his conclusions, reiterated his former conclusions, stating that Mr. Anthony did not find *tintinnabulum* in the Ohio, but did find *cincinnatiensis*, and satisfied himself that it was the young of *prærosa* and that he, himself, had examined "thousands of specimens from many localities" and was "fully convinced that *subglobosa* and *tintinnabulum* are the same species." And this position was maintained in his elaborate monograph of the *Streptomatidae* published by the Smithsonian Institution in 1873.

Since then, so far as I have been able to ascertain, nothing has been published on the subject.

It is obvious that, if these different forms of *Anculosa* exhibit as claimed by Lewis persistent and characteristic differences in the young shell, a valuable standard of comparison can be established, which will, when thoroughly worked out, enable us to definitely determine their relationships and their claims to specific or varietal recognition. And although, for a complete solution of the questions of synonymy involved, full suites of all ages of all the different forms would be necessary, any detailed information will be of value, both as leading the way towards the final settlement of the matter and as an incentive to further investigation and systematic work in the field for the acquisition of the material still necessary for successful results. For these reasons, the following notes have been compiled and, with full recognition of the fact that they are necessarily incomplete and quite insufficient for any broad generalizations and are of value only so far as they deal with material under observation, are published with the hope that they may lead others to review the material in their possession and incite additional effort toward securing the missing links.

I. ANCULOSA PRÆROSA SAY. Pl. X., figs. 1-6.

Unfortunately I have not been able to obtain any of the minute young of this species from the Ohio River, the smallest specimens seen having passed the carinate stage. But from a comparison of these with those of corresponding size and development from a very complete series of all sizes, ranging from .0125 mm. in diameter to

the fully matured shell, from the Tennessee river at Florence, Ala., collected by Mr. A. A. Hinkley, there seems to be no doubt but that the changes in growth of the two series have been identical.

The minute young in the Florence series have the apical whorls carinate and the body-whorl bicarinate. I have no difficulty in identifying this form with Lea's *cincinnatiensis*. The type had four whorls and measured 4 mm. in height by 3.5 in diameter. As a standard for comparison I have selected an individual of exactly these dimensions (Fig. 1); although most of the specimens of that diameter are more depressed, the altitude and width being substantially the same.

This specimen agrees with the original diagnosis in every particular with one exception. Lea states that the type had three bands and that the two carinæ were colored. Whether the three bands included the two carinal bands, he does not say. All of my specimens, with one exception, exhibit four bands within the aperture. Two are carinal, one is between the upper carina and the suture, and the fourth between the lower carina and the umbilical depression. These bands are continuous or broken into spots, and sometimes the upper and lower pairs are more or less confluent. The exception has only the upper pair of bands, the lower carina and basal area being uncolored. I do not regard the variation in banding of any material importance and, therefore, have no hesitation in proceeding on the assumption that these bicarinate individuals are the *cincinnatiensis* of Lea. As shown by Fig. 1, the typical form of *A. cincinnatiensis* has four whorls; the spire is acutely conical, its whorls flattened and bounded below by the projecting carina, the suture of the succeeding whorls being on the under side of the carina and slightly within the outer edge; the body whorl is strongly bicarinate, flattened above the superior carina, *concave* between the carinæ and with the basal arc area flattened and very oblique. The shell is rather translucent, light horn-color, more or less tinged with green; apex is red, lighter than the supracarinal band, and the bands dark reddish-brown; the superior band is broad and on the apical whorls fills nearly the entire space between the carina and the suture, so that the whorls appear wholly dark colored; the basal band is broad, the color extending to same degree over the entire umbilical area; the columella is more or less tinged with purple. The aperture is large "rounded,"

but slightly modified, however, by the carinæ. The nepionic whorl is smooth, or very slightly and irregularly roughened or pitted; this perhaps may be the result of incipient erosion. Below this, the lines of growth on the second and third whorls are strong, straight and quite regular, and intersecting these are numerous stronger, parallel, revolving striæ, which give a reticulated appearance to the surface; on the fourth whorl the revolving lines sensibly diminish in strength and towards the aperture become subobsolete. This sculpture is uniformly present and is apparently characteristic of the bicarinate form. The persistence of the revolving lines varies in different individuals. Usually they fade out as the shell assumes the globose form, but occasionally continue until the shell is nearly mature.

There is considerable variation in the height of the apical whorls. Most of the specimens in the bicarinate stage are more depressed than the type and the carina is less prominent on the superior whorls. Fig. 2 is the most depressed individual seen, and the spire is wholly flattened with no projection of the carina above the body whorl. As the shell increases in size, the superior carina becomes less prominent, the lip of the lower whorl rises and gradually passes over its edge, and, thenceforth, the shallow suture characteristic of the mature shell is maintained. Erosion begins, the acute spire and, generally, all the sculptured whorls disappear, and the shell assumes the characteristic globular shape of maturity.

During this stage, the carinæ progressively diminish in strength and become mere angles and finally disappear. The groove between them widens and becomes plane and persists in the half-grown and mature shells as the characteristic flattening of the body whorl. The superior carina is the less persistent and completely disappears in the regularly rounded curve of the upper part of the whorl. The lower carina and the resulting angle remain longer in evidence and cause in the mature shell the greater width of the lower part of the body whorl. The carinæ persist longer in the more conical specimens (Fig. 4) than in the depressed individuals (Fig. 3). For comparison with this stage in the Florence series, the smallest example seen from the Falls of Ohio is figured (Fig. 5). It measures 5.5x5.5 mm. The apical whorls are somewhat eroded, but enough is left to show that they were carinate and had the characteristic sculpture ascribed to *cincinnatiensis*. They are more depressed

than any of the Florence series, and the body whorl is much more gibbous. This feature is still more emphasized in a small series of *prærosa* from the Ohio at Golconda, Ills., also collected by Mr. Hinkley. In these (Fig. 6), as the shell advances beyond the bicarinate stage, the lip passes over the superior carina and overlaps the preceding whorl, forming a slight shoulder around it, so that upon the completion of an entire whorl, the spire appears, as it were, in a flattened depression with the short, apical elevation in the centre. Whether this is constant in the *prærosa* of the Ohio, the series under examination is too small to establish. But the similarity of the specimen from the Falls of the Ohio (the type locality) suggests that it may be. It is very desirable that a full series of all sizes from the Ohio should be examined, so that the manner of growth of the typical form may be definitely determined.

By a careful selection of the less eroded specimens, the whole process of growth can be traced from the typical bicarinate form of the young to the smooth rotundity of the adult shell and there is apparently no question but that the *cincinnatiensis* of Lea is the young of the *prærosa* of Say.

II. ANCULOSA SUBGLOBOSA Say.

This species, in some localities at least, seems to be less subject to erosion than its associated species of the genus; and specimens nearly if not quite mature, with perfect apices, are not uncommon. The tracing of the growth of the shell from the early stages to maturity is, therefore, a matter of comparative ease.

The series of young shells in the Lewis collection, of which the smallest (Fig. 9) measures alt. 3.25, diam. 3.55 mm., with one exception, is very uniform, and there can be no doubt but that they are the young of the typical form as figured by Tryon (Mon. figs. 799 and 800). They are gibbous, translucent, light horn-color, unicolored or banded, smooth and shining, apex acutely conical, the tip tinged with dark brown, whorls rounded, suture well impressed, with no trace of any carina whatever. The shell increases very rapidly in size, but retains its peculiar form until nearly mature. For comparison with Figs. 3 and 8 a larger specimen (5x5 mm.) is also figured (Fig. 10).

The exception above noted (Fig. 11) is quite different in shape and would seem to be specifically distinct. It measures 5.5x5 mm.,

and is of a light greenish-yellow and much more globular than the others and barring the bands, which are three instead of two as called for by the original description, has great resemblance to *A. globula* of Lea. The aperture is almost exactly two-thirds of the length of the shell. Among a small set from the Holston at Knoxville, Tennessee, collected by Mr. A. C. Billups, are larger specimens (10x8.5 mm.) of the same form, but I have been unable to trace it with entire satisfaction to maturity. It is, however, apparently the immature form of the species that Dr. Lewis identified with the *A. virgata* of Lea. But whatever the relation of the form to *subglobosa* may be, it agrees with it in its smooth, shining, rounded whorls with no impressed spiral lines and no carinæ.

III. A. TINTINNABULUM Lea.

Dr. Lewis' series of this species is very complete and as he states, there can be no question but that the bicarinate form that he identified with Lea's *cincinnatiensis* is the young of *tintinnabulum*. But they are quite different from the true *cincinnatiensis* if I am right in my identification of that form, and seem to be specifically distinct. Compared with *cincinnatiensis* of the same size, these shells (Figs. 7 and 8) have a more elevated spire and are much thicker, being quite opaque and noticeably more heavily moulded; the surface of the whorls above the superior carina is decidedly convex above and excavated below as it approaches the carina, so that on the third and fourth whorls there is a well-developed groove immediately behind the carina; the carinæ are much stronger, the superior projects upwards rather than laterally, and is formed more by the excavation of the upper surface of the whorl behind the uplift of the intercarinal area, than by the lateral projection of the carina, as in *cincinnatiensis*; the lower carina is much stronger and projects laterally; the intercarinal area is relatively wider and very flat, being scarcely at all concave; the basal area is much more excavated immediately below the inferior carina. While color is, perhaps, the least reliable factor in specific distinction in *Anculosa*, in this series it is remarkably uniform and very striking. The shells are uniformly light greenish-yellow with two broad reddish-brown bands on the body whorl, one above the superior carina and the other on the basal area immediately below the inferior carina; the apical whorls are reddish-brown; the intercarinal area has no band, the carinæ are

noticeably lighter in color than the rest of the shell and stand out conspicuously against the dark bands above and below them. As the shell grows, the superior band widens and invades the region of the superior carina, sometimes before it has entirely disappeared, and occasionally divides into two narrow bands, the basal band persists and in the adult the space between them represents the intercarinal area of the young shell.

The spiral lines are uniformly present and rather stronger than in *cincinnatiensis* and apparently persist longer as the shell approaches maturity.

As the shell increases in size, the superior carina diminishes and finally disappears entirely; the lower carina persists much longer, descends somewhat in position and becomes a characteristic feature of the half-grown shell and, in the adult, causes the bell-shaped form which gives to the species its specific name.

IV. CONCLUSIONS.

From the examination of the material as above detailed, the following conclusions may be drawn.

1. That in these species of *Anculosa* at least, the very young shells have characteristics which are constant and available for specific distinction.

2. That the young shell of *A. prærosa* is bicarinate and spirally striate and was described by Lea as *A. cincinnatiensis*.

3. That the young shell of *A. subglobosa* is ecarinate and without spiral, impressed lines.

4. That the young shell of *A. tintinnabulum* is bicarinate and spirally striate, but specifically different from Lea's *cincinnatiensis*.

5. That *A. tintinnabulum* Lea is specifically distinct from both *A. prærosa* and *A. subglobosa*, and is a valid species.

6. That collectors and especially those in the field should give special attention to securing full *suites* of all the species of all ages, particularly the very young, so that the exact relations of all the described species may be definitely determined.

EXPLANATION OF PLATE X.

All the figures are on the same scale, $\times 48$.

Fig. 1-4. *A. prærosa* Say—Tennessee River, Florence, Ala.

Fig. 5. *A. prærosa*—Falls of the Ohio.

Fig. 6. *A. prærosa*—Ohio River, Golconda, Ills.

Fig. 7–8. *A. tintinnabulum* Lea—Holston River, Tenn.

Fig. 9–10. *A. subglobosa* Say—Holston River, Tenn.

Fig. 11. *A. globula* Lea?—Holston River, Tenn.

A NEW SPECIES OF PYRGULOPSIS.

BY A. A. HINKLEY.

The finding of a new species of *Pyrgulopsis* is a surprise, coming as it does from such a well-known stream as the Wabash, a river which has furnished many forms of shells found nowhere else north of the Ohio river, though common in southern streams. There was found associated with the new species *Somatogyrrus strengi* Pilsbry and Walker, a recently described southern species, which adds another to that list of, shall we call it freak geographical distribution? or is there some known cause for the occurrence of southern forms in the Wabash? It seems a little strange that no species of shells bears the name of the Wabash river. The writer thinks now a good time to use the name.

PYRGULOPSIS WABASHENSIS, n. sp.

The shell is imperforate, pupiform, smooth, horn-colored; growth lines faint; composed of five convex whorls separated by an impressed suture. The periphery is rounded or slightly angular. The aperture oblique, ovate, angular above, rounded below. The columella a little reflected. Columellar callus thickened; on the parietal wall the outside edge straight and raised.

Length .12, diam. .06 of an inch.

Found in shallow water of the Wabash river, at the Chains in Posey county, Indiana, by the writer's son, George Hinkley. Compared with *P. mississippiensis* this species is smaller, has not the angular or carinate body whorl, the spire is not so acutely conical, and the aperture is not as wide. The *mississippiensis* is conical with flat whorls; this species is pupiform with rounded whorls. Some examples of *wabashensis* have a slight shoulder on the penultimate whorl just above the suture, others have an impressed line on the body whorl a little distance below the suture.

Examples are in the collections of the Academy of Natural Science, Philadelphia; The National Museum; The Chicago Academy of Science, Mr. Bryant Walker, and the writer.

NOTES ON SOME AUSTRALIAN UNIONIDÆ.

BY L. S. FRIERSON.

A series of shells covering nearly the whole range of species credited to Australia having been received from the well-known conchologist, Mr. Wm. T. Bednall of Adelaide, reveals several interesting points, which may constitute as many "addenda and corrigenda" to Mr. C. T. Simpson's "Synopsis of the Naiades."

Page 891. *Unio bednalli* Tate was described in 1882, Proceedings Royal Society of South Australia, page 56. The shell, as evidenced by notes, and a fine series of specimens from Mr. Bednall, is not a form of *Diplodon australis* (Lam.) Hanley, but is much nearer to *D. wilsonii* Lea (= *stuarti* Adams and Angas). A specimen of *bednalli* is over $3\frac{1}{2}$ inches long by $1\frac{3}{4}$ high, whereas a specimen of *D. australis* var. *legrandi* (an elongated variety) is 3 inches long and 2 inches high). *D. bednalli* Tate therefore should be removed as a synonym of *australis*, and restored to specific rank, from whence, should it ever be degraded, it must fall under *D. wilsonii* Lea, as a variety.

A series of shells labeled *U. angasii* Lea revealed the following facts: *U. angasii*, credited to MSS. of Lea, was described by Sowerby in *Conchologia Iconica*, and placed by Mr. Simpson as a synonym of *D. shuttleworthii* Lea. A casual observation of the lot seemed to indicate two species. A critical study of both the actual specimens with the original descriptions of both species confirmed this impression. *Diplodon shuttleworthii* Lea (besides being apparently larger) has a deeply and coarsely sulcated disc, and is covered with a heavy, thick, scaly epidermis resembling that of *D. cucumoides*.

On the other hand the *D. angasii* Sowerby is apparently a smaller species, is much *thinner*, with a smooth surface and covered with a *thin* epidermis, with nothing more than *fine* sulcations, scarcely noticeable. But as a final clincher, a young specimen of *D. angasii* (having beaks so perfect as to show the glochidial shell) shows a

beak having not a trace of radial sculpture, but only a *fine*, concentric sulcation. Hence the shell not only is not *D. shuttleworthii*, but strictly speaking is not even a *Diplodon*. The beaks of *D. shuttleworthii* have "strongly, irregularly radiate, curved bars."

Mr. Bednall was unable to procure for me a single example of *D. vittatus* Lea, or *D. evansii* A. & A., or of *D. wilsonii*, having un-eroded beaks. But from the general similarity of the shells, it is, I believe, more than probable that a subgenus composed of these and possibly other Australian shells, having concentric beak sculpture or none, should be made and the definition of *Diplodon* be correspondingly broadened.

NOTES.

NOTICE TO SUBSCRIBERS.—Among the amendments to the Postal Laws and Regulations, to take effect Jan. 1, 1908, is the following—"a reasonable time will be allowed publishers to secure renewal of subscriptions, but unless subscriptions are expressly renewed after the term for "which they are paid within the following periods: [monthlies within four months] they shall not be counted in the legitimate list of subscribers." Subscribers will confer a great favor by paying promptly. A bill is sent when subscription is due.

H. A. P., C. W. J.

PUBLICATIONS RECEIVED.

A NEW PTEROPOD FROM NEW ENGLAND.—By C. H. Danforth, (Proc. Boston Soc. Nat. Hist., vol. xxxiv, pp. 1-19, pl. 1-4).

This new pteropod, *Pædoclione doliiformis*, which also proves to be a new genus, was taken in the plankton of Casco Bay, Me., on the nights of Aug. 28 and Sept. 5, 6, 7 and 8, 1902. On a hasty examination it was referred to a larva of some gymnosomatous pteropod. Later, in making some sections, they were found to be sexually matured adults. "This genus does not properly fall under any established family although perhaps it approaches most nearly the *Clionidæ*, from which it differs in having an odd number of cephalocones and in having the entire posterior part of the body filled by the viscera." The species is described as: "Transparent;

barrel-shaped; small, about 1.5 mm. in length; head when expanded elliptical in outline; anterior ciliated band broken up into segments; expanded parapodia (wings) flat, long-ovate; middle lobe of foot rather large." The author gives a very exhaustive account of its general features, musculature, digestive and nervous systems, heart and nephridium, and the reproductive system. The paper is illustrated by four plates and two figures in the text.—C. W. J.

THE HALIOTIS OR ABALONE INDUSTRY OF THE CALIFORNIAN COAST.—By Mrs. M. Burton Williamson (Am. Hist. Soc. S. Cal., vol. vii, pp. 22–30, 1907). An exceedingly interesting account of this important industry. The law protecting these shells is like the law protecting the lobster on the Atlantic. The young are protected but those which produce young are not. The author asks the pertinent question—"If these mollusks are destroyed as soon as old enough to propagate, of what use to the State is the preservation of the young?" The present method in time can only lead to their extermination. The shells should be protected at least during their breeding period.—C. W. J.

THE MOLLUSCA OF MAST HEAD REEF, CAPRICORN GROUP, QUEENSLAND, Pt. II.—By C. Hedley (Proc. Linn. Soc. N. S. Wales, vol. 32, pp. 476–513, pls. 16–21, 1907). In this paper 37 new species are described and beautifully figured. A list containing some 447 species from this reef, procured within a week, in a six-mile radius from one spot, shows the richness of the fauna.

THE PYRAMIDELLID MOLLUSKS OF THE OREGONIAN FAUNAL AREA.—By WILLIAM H. DALL and PAUL BARTSCH (Proc. U. S. Nat. Mus., XXXIII, pp. 491–534, pls. 44–48, 1907). The species described in this paper have been selected from a monograph of West American *Pyramidellidae* upon which the authors have been at work for some time, but which has been unavoidably delayed. The Oregonian Faunal Area includes the region extending from the northern limit of the Alexander Archipelago southward along the coast to Pt. Conception, Cal. Thirty-eight new forms are described and beautifully figured together with many others already known imperfectly from this region.—C. W. J.

THE NAUTILUS.

VOL. XXI.

MARCH, 1908.

No. 11.

MOLLUSCAN FAUNA OF THE SAN BERNARDINO MOUNTAINS, CALIFORNIA.

BY S. S. BERRY.

In view of the extraordinary researches carried on in the neighboring regions of Arizona and New Mexico by Messrs. Ashmun, Ferriss, Pilsbry, and other recent collectors, the writer has often wondered what might be the result of an equally diligent effort in the mountain ranges of Southern California. But little work seems to have been done in the region, and reports on that little are scattered and fragmentary.

During the month of August, 1907, the writer spent two weeks camping in the San Bernardino Mountains, California, and although he had other business on hand than the advancement of a hobby, he kept his eyes open for mollusks, and is thus enabled to add another fragment to the records.

The San Bernardino Mountains range in height from about five thousand to nearly twelve thousand feet above sea-level, and abound in grand and beautiful scenery. Extending, as they do in an easterly-westerly direction, the northern slope of the mountains drains into the Mojave Desert, the southern into the Pacific. No mollusks whatever were found in the desert drainage, but the writer was able to give only a superficial examination to all but one or two spots, and has no doubt but that his collections represent a far from complete index to the life of the region.

The cañons and higher regions are well wooded, but the soil is

generally dry at this time of the year, although there are numerous brooks and rills, with here and there an open swampy meadow or cienaga.

Bear Lake is a partly natural, partly artificial reservoir, some five or six miles long by perhaps a half a mile wide, and about sixty-five hundred feet above sea-level. It is the home of multitudes of small forms, most of them being species of wide distribution. High up on the mountain to the south of the lake is Bluff Lake, a small summer resort, at an altitude of 7,550 feet. In this case the "Lake" is only a large cienaga with a swamp at its lower end. This swamp, with the creek which flows from it, proved a very interesting locality, while all the land mollusks seen on the trip were found either under sticks and logs at the edge of the meadow or nearby in the woods.

It is notable that none of the larger *Helices* were found, although *Glyptostoma newberryanum* should occur here just as it does in the neighboring San Gabriel Range, and I have seen living specimens of *Epiphragmophora tudiculata* W. G. B. from the base of these mountains.

A list of the species obtained is herewith appended:

Pisidium californicum Newcomb (?). Two "somewhat different forms" were thus determined by Dr. Sterki, who says that *P. californicum* itself is somewhat in doubt. They occur together, and are rather common in the quieter pools of Bluff Lake Creek, in ditches in the meadow, and in the swamp.

A number of minute *Pisidia* found in a spring on a nearby hillside are probably young of the same.

Pisidium (sp. ?). Two specimens from the swamp are of "different shape from the remainder," according to Dr. Sterki, but whether or not distinct he was unable to say.

Musculium raymondi J. G. Cooper. Found commonly in the swamp, and rather rarely in the creek at Bluff Lake.

Valvata (sincera, Say?) var. Bluff Lake Swamp (two specimens) and in Bear Lake, where it seems fairly common on and under stones.

Lymnæa palustris Müll. A small variety of this species occurs commonly in Bear Lake. It is extremely variable, generally tending toward the form called *nuttalliana* by Lea. The maximum longitude of the numerous specimens collected in Bear Lake is but about ten millimeters.

Lymnæa palustris nuttalliana Lea. Occurring with the preceding in Bear Lake and intergrading with it, this form is also abundant in Bluff Lake Creek and the swamp at its head. The specimens from these localities are very distinct and uniform, and several hundred examples showed no tendency to grade into typical *palustris*. All the specimens found here are very much larger and less fragile than those from Bear Lake.

Physa cooperi Tryon. Common in Bear Lake, and a smaller form was found in myriads in a watering trough on the City Creek Cañon Road. (Alt. about 2000 ft.)

Physa sp. May be a variety of the preceding with which it occurs in Bear Lake, but it has a much more ventricose body-whorl.

Physa politissima Tryon. Bear Lake—common. A fine, large species.

Planorbis trivolvis Say. Bear Lake; Bluff Lake Creek; swamp at Bluff Lake. Very common, but specimens generally much eroded.

Planorbis parvus Say. Swamp at Bluff Lake. Specimens identified by Dr. Pilsbry.

Planorbis vermicularis Gould. Not uncommon in Bear Lake. Specimens identified by Dr. Dall. It seems to me that this species is hardly more than a mere form of the preceding, although the specimens from Bear Lake have a more rounded and less flattened body-whorl, and are quite readily separated from those found in the swamp.

Vitrina alaskana Dall. Two specimens under sticks in the meadow at Bluff Lake.

Zonitoides arborea Say. About a dozen specimens found about an old stump in the border of the woods at Bluff Lake.

Euconulus fulvus Draparnaud. Bluff Lake; two specimens under logs at the edge of the meadow. This species has already been reported from "San Bernardino County" by Binney.

Vertigo occidentalis Sterki. One specimen (the type, No. 1860 of my collection) was found near a spring in the cañon side below Bluff Lake Swamp. Diligent search on two occasions produced not another specimen, but this was enough for Dr. Sterki to pronounce as "evidently of an unknown species." It is described in NAUTILUS XXI, p. 90, q. v.

Epiphragmophora tudiculata W. G. Binney. At the base of the mountains near Highland (1904); near Mentone (1906); also reported from above San Bernardino.

SUBDIVISIONS OF THE TEREBRIDÆ.

BY WILLIAM H. DALL.

Having recently had occasion to review the genera of *Terebridæ*, it seemed that the synoptical table might have some interest for students.

Genus TEREBRA Bruguière, 1789.

A. Presutural sulcus present.

Sculpture uniform at all ages, persistent, suture appressed. Subgenus STRIOTEREBRUM.

Shell short, small.

1. Sculpture reticulate. Section *Strioterebrum* s. s.
2. Axial sculpture emphatic, spiral obsolete. *Fusoterebra*.
3. Axial sculpture obsolete, spiral emphatic. *Perirhoë*.

Shell elongate, whorls mesially constricted.

4. Whorls nodulous at both margins. *Triplostephanus*.

B. Sculpture in youth and age discrepant. Subgenus TEREBRA.

5. Young nodulous, sulcus persistent. Section *Myurella*.
6. Young nodulous, sulcus present in youth. *Terebra* s. s.

Young axially ribbed, sulcus persistent.

7. Adult slender, smooth. *Subula*.
8. Adult small, obsoletely ribbed. *Abretia*.

Sulcus obsolete in the adult.

9. Whorls rapidly enlarging. *Oxymeris*.

C. Sulcus wholly absent. Subgenus ACUMINIA.

10. Adult slender, smooth. Section *Acuminia*.

Genus HASTULA Adams, 1853.

Presutural sulcus absent, suture appressed.

A. Sculpture uniform, persistent.

- a. Shells small, slender. *Hastula* s. s.

B. Sculpture discrepant.

- b. Whorls rapidly enlarging. *Impages*.

Genus DUPLICARIA Dall, 1908.

A. Sculpture persistent, suture channeled.

- a. Shell axially ribbed, sulcate. *Duplicaria*.

Genus SPINEOTEREBRA Sacco, 1891.

A. Sulcus absent, suture appressed.

a. Columellar border callous, axis impervious. *Spineoterebra*.

b. Columellar border bare, axis pervious.¹ *Mazatlan*.

This table is not intended to exhibit all, or even the more important characters upon which the main subdivisions (which will be treated elsewhere) are based, but is rather a key by which the shells may be conveniently assorted. The sections are typified as follows:

Strioterebrum Sacco, 1891. *T. basteroti* Nyst.

A recent example is *T. dislocata* Say.

Fusoterebra Sacco, 1891. *Fusus terebrina* Bonelli.

A recent example is *T. benthalis* Dall.

Perirhoë Dall, 1908 (nov.). *T. circumcincta* Deshayes.

An American example is *Acus rushii* Dall.

Triplostephanus Dall, 1908 (nov.). *Terebra triseriata* Gray.

This is *Myurella* Hinds, in part.

Terebra s. s. Lamarck, 1799. *T. subulata* (Linné).

Myurella Hinds, s. s. 1844. *Terebra myuros* Lam.

Subula s. s. (Schumacher, 1817) Gray, 1847. *T. dimidiata* (Linné).

Abretia H. and A. Adams, 1853. *T. cerithina* Lam.

Oxymeris Dall, 1900. *Terebra maculata* Lam.

This is *Acus* Gray, 1847, not Edwards, 1771.

Acuminia Dall, 1908 (nov.). *T. lanceata* (Linné).

Hastula H. and A. Adams, 1853. *T. strigillata* Lam.

Impages E. A. Smith, 1873. *T. cærulescens* Lam.

Duplicaria Dall, 1908 (nov.). *T. duplicata* Lam.

This is *Myurella* Troschel, not of Hinds.

Mazatlan Dall, 1903. *T. aciculata* Lam.

Spineoterebra Sacco, 1891. *T. spinulosa* Doderlein. Miocene.

Mazatlan is *Euryta* Adams, 1853, not of Gistel, 1848.

¹ I use the term "pervious" technically, to denote an axis gyrate about an empty space which penetrates the center of the shell internally, in contradistinction to "umbilicate" or "perforate," which would imply a space external to the inner wall of the whorls and circumscribed by them.

NEW SPECIES OF ANCYLIDÆ.

BY BRYANT WALKER.

NEOPLANORBIS SMITHII n. sp. Pl. IX, figs. 1 and 2.

Shell minute, planorboid, perforate, slightly convex above and below; periphery obtusely angulate; thin, translucent, whitish, shining with a silky luster from the fine, closely set, regular lines of growth. No trace of spiral sculpture. Whorls 2, rapidly enlarging; apex sunken; the last half of the first whorl elevated above the outline of the body whorl; apical whorl convex, the convexity rapidly diminishing towards the aperture; suture well impressed, rising somewhat at the aperture; aperture large, oblique, slightly expanded, equally curved above and below; columellar margin dilated, straight and vertical, callously thickened below, smooth; umbilicus a mere perforation.

Alt. 1, diam. 2 mm.

Types (No. 27149, Coll. Walker) from the Coosa river at Higgin's Ferry, Chilton Co., Ala. Co-types in the collection of T. H. Aldrich, Geo. H. Clapp, John B. Henderson, Jr., and the Philadelphia Academy.

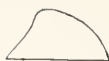
This little species differs from *tantillus* and all the other known forms of the genus by the entire absence of spiral sculpture and the elevation of the spire above the level of the body whorl. The animal is black and the shell consequently appears of that color until cleaned.

NEOPLANORBIS UMBILICATUS n. sp. Pl. IX, figs. 3 and 4.

Shell minute, planorboid, umbilicate, convex above and below, but flattened above as it approaches the aperture and obliquely flattened below the periphery; periphery obtusely carinate; brownish horn-color; lines of growth fine and regular; surface sculptured by raised spiral lines, which are heavier below than above the periphery. Whorls 2, rapidly enlarging, apex sunken; apical whorl very convex; body whorl nearly flat in the sutural region, but curving down rapidly toward the peripheral carination; suture well impressed and depressed below the periphery at the aperture; aperture large, wider than high, flattened above and below, the upper and lower margins being nearly parallel, obliquely flattened below the periphery; columellar margin broadly dilated, curved and partially



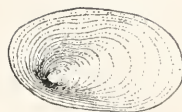
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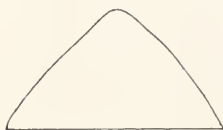
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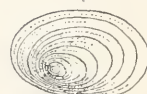
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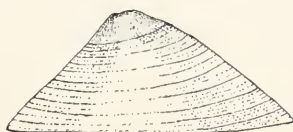
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covering the umbilicus; columella curved, with a heavy callus and obtuse tubercle in the center; umbilicus round and deep. The animal is yellowish.

Alt. 1, diam. 2 mm.

Types (No. 27150 Coll. Walker) from the Coosa River at "The Bar" $2\frac{1}{2}$ miles above Yellowleaf Creek, Chilton Co., Ala. Cotypes in the collection of T. H. Aldrich, Geo. H. Clapp, John B. Henderson, Jr., and the Philadelphia Academy.

This species resembles *tantillus* in being spirally striate but differs in being umbilicate and in having a tooth on the columella, as well as in the general shape. It does not resemble *smithii* in any of its special features, and differs from *carinatus* in being more obtusely carinate and in the wider umbilicus and stronger spiral striation.

NEOPLANORBIS CARINATUS n. sp. Pl. IX, figs. 17 and 18.

Shell minute, planorboid, narrowly umbilicate, nearly flat above, convex below, but obliquely flattened below the peripheral carina, which is strong, but rather blunt; pale horn-color; lines of growth fine, closely set and regular, sculptured above by a few fine sub-obsolete spiral lines, stronger towards the periphery; under surface with numerous fine spiral lines heavier than on the upper. Whorls 2, rapidly enlarging; apex sunken; apical whorl somewhat flattened above, convexly rounded at the periphery which, at about the beginning of the body whorl, becomes angulate and then carinate; the body whorl above is slightly convex in the center, but flattened toward the suture, and "pinched out" at the periphery to form the carina; suture well impressed, descending toward the aperture below the periphery; aperture large, much wider than high and auriculated at the periphery by the carina; upper and lower margins flattened and nearly parallel; columellar margin dilated, free, slightly curved back over the small, round umbilicus, and obtusely angled where it joins the basal margin; columella somewhat thickened, with a small obtuse tubercle at about the center.

Alt. 1, diam. 2 mm.

Types (No. 27151, Coll. Walker) from the Coosa river at Duncan's Riffle, Coosa Co., Ala. Cotypes in the collections of T. H. Aldrich, Geo. H. Clapp, John B. Henderson, Jr., and the Philadelphia Academy.

In form the species reminds one of a minute *Planorbis oper-*

cularis Gld., its most prominent characteristic being the nearly plane upper surface with a strong peripheral carina. It resembles *umbilicatus* in being spirally striate and having a columellar tooth, but differs in the greater development of the carina, narrower umbilicus and in having the spiral lines much weaker. It differs from *tantillus* in the greater development of the carina, in the small but round umbilicus, dentate columella and weaker spiral striation. The animal is black.

All these species of *Neoplanorbis* were discovered by Mr. Herbert H. Smith in the fall of 1907. They live on the under sides of stones in the more or less rapid current and in suitable localities are very abundant. Mr. Smith took 50 from one small stone. *Neoplanorbis* seems very local in its distribution. It may be abundant on one shoal and not found at all on another. And on the same shoal, it is frequently restricted to one side of the river or the other.

In his progress down the river in 1907, Mr. Smith did not find *Neoplanorbis* at all, until he reached Cedar Island, Chilton Co., three miles above the mouth of the Yellowleaf Creek, where a single specimen of *umbilicatus* was found.

At "The Bar" two miles further down *umbilicatus* was found in some abundance on stones in a strong current, while at the same place *carinatus* was found in a moderate current. There was no intermingling of the species in these two situations. *Umbilicatus* was not met with below this point.

At Butting Ram Shoals, five miles below, in a moderate current, the catch was almost entirely *carinatus*, the exception being three specimens of *smithii*.

At Higgins' Ferry, seven miles further down stream, in a moderate current, with the exception of a single example of *carinatus*, the several hundred specimens were all *smithii*.

While at Duncan's Riffle seven miles below, the catch contained two specimens of *smithii*, the balance being *carinatus*.

Duncan's Riffle is twenty-four miles by river above Wetumpka, so that, in view of these facts, it is not surprising that *N. tantillus* was not met with at all.

The following key may be of assistance in differentiating the four species of *Neoplanorbis* now known :

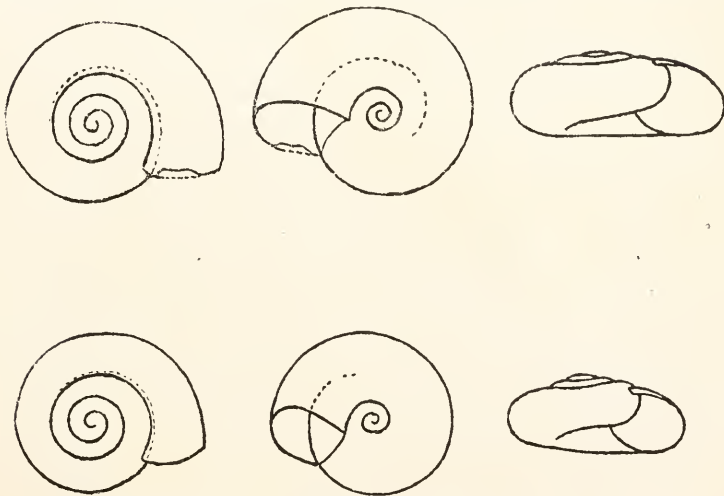
1. Umbilicate, columella dentate 3.
2. Perforate, columella smooth 4.

3. { Periphery carinate, umbilicus narrow *carinatus*.
 { Periphery obtusely angled, umbilicus wider. *umbilicatus*.
 4. { Spirally striate, periphery carinate *tantillus*.
 { No spiral striæ, periphery rounded *smithii*.

VITREA LEWISIANA N. SP.

BY GEO. H. CLAPP.

Shell small, depressed widely, perspectively umbilicate, all whorls showing to the apex, umbilicus contained about five times in the diameter of the shell ; yellowish-white, translucent, the inner whorls



Upper figures, *Vitrea lewisiana* Clapp. Type, x8.

Lower figures, " *dalliana* 'Simpson' Pils. x8. Miami, Fla.

showing through the body of the shell, highly polished ; the delicate growth lines are very regularly spaced and close together, smooth below. Spire much flattened ; sutures well impressed, margined ; whorls $3\frac{1}{2}$, slightly convex, the last wide. Aperture oblong-lunate, depressed above, lower margin parallel with the base, lip simple.

Gr. diam. $3\frac{1}{2}$, lesser 2.8, alt. $1\frac{1}{2}$ mm.

Type from Monte Sano, near Huntsville, Ala., also found at Wetumpka and Gurley, Ala., so probably extends over the whole eastern part of the state. *Rare*. Collected by Herbert H. Smith.

I name this species in honor of the late Dr. Jas. Lewis, whose work on the southern mollusca is well known.

The color, and particularly the *very regular, close* lines of growth at once distinguish this shell from all other species. It is perhaps nearest to *V. dalliana*, but differs in color, shape and sculpture. In *dalliana* there is a very minute spiral sculpture, not mentioned in the original description, and only visible under a magnification of about 60 diameters.

NOTES.

NOTE ON *HELIX HORTENSIS*.—In my article on the distribution of *Helix hortensis* (THE NAUTILUS, XX, p. 73, 1906). I overlooked a very interesting article by Robert Bell, Jr., "On the Natural History of the Gulf of St. Lawrence, and the distribution of the mollusca of Eastern Canada." (The Canadian Naturalist and Geologist, IV p. 215, 1859). As the note on *H. hortensis* has an important bearing on its distribution and is probably inaccessible to many, I quote it in full: "It seems scarcely credible that this species has been imported from Europe, considering how widely diffused and vastly numerous it has become along the Lower St. Lawrence. On the mainland it was first observed on Mount Commis, about nine miles south of St. Luce and on the coast at Metir, where it was abundant and below which it seems to occupy the place of *H. albolabris*, but is generally much more numerous. In 1857, I found vast numbers of them on the Brandy Pots and Hare Island in the middle of the St. Lawrence opposite Rivière du Loup. The climate of Gaspé seems to be very favorable to their propagation, as they appear to have spread over the country for a considerable distance in land. The yellow and banded varieties seem to be about equally numerous. Where land has been recently cleared and burnt over, their withered shells may be seen strewed in thousands over the surface of the soil. In the valley of the Marcouin they were observed to extend 12 miles inland, which was farther than at any other place. The height at which the last specimen was found was about 1500 feet above the sea, as indicated by the barometer which we had with us. The young from the size of a grain of duck shot to half that of the adult shell were met with in our journey up this valley in the end of July." With this record as a basis it would be

interesting to know to what extent the species has spread during the past fifty years, or whether with advancing civilization and the clearing and burning of the woods it has diminished. We have no recent records outside of the Gaspé region.—C. W. JOHNSON.

WE regret to announce the death of Charles Abbott Davis, Curator of the Roger Williams Park Museum, Providence, R. I. He died January 29, at the age of thirty-nine years.

NOTE ON *TURBONILLA CASTANEA* AND *ODOSTOMIA MONTEREYENSIS*.—In the hurry of departure for the Philippine Islands, Dr. Bartsch applied to two new Pyramidellids in our recent paper (No. 1574) in the U. S. Nat. Museum Proceedings, the names *Turbonilla* (*Pyrgiscus*) *castanea* (p. 509) and *Odostomia* (*Amaura*) *montereyensis* D. and B., (p. 531). These names being preoccupied, I propose to substitute *T. (P.) castanella* and *O. (A.) canfieldi*.—WM. H. DALL.

MILAX GAGATES AND VITREA CELLARIA IN COLORADO.—Four of my students, Messrs. Walter Groom, Floyd House, Merrit Hunt and William Wiuner, recently examined the greenhouses of Boulder for Mollusca, to be used for class purposes. Quite to my surprise, they obtained five species, two of which had not previously been found in Colorado. *V. alliaria* was first found in Colorado last year, also in a Boulder greenhouse. The species obtained were:

(1) *Milax gagates* (Drap.). Many, of various ages, all of the variety *plumbea*, and with the keel rather inconspicuous in life. They probably came from the Pacific coast, and represent the *hewstoni* form, which I have never been able to separate from *gagates*.

(2) *Agriolimax agrestis* (L.). Several, from light reddish to almost wholly black.

(3) *Agriolimax campestris* (Binney). One.

(4) *Vitrea cellaria* (Müller). Many specimens, some of good size.

(5) *Vitrea alliaria* (Miller). Several, with the garlic odor very strong.

P. S., Feb. 6.—The examination of the Boulder greenhouses has been continued, and to-day Mr. Ivan Beck brought in a number of *Vitrea lucida* (Drap.), also new to Colorado. One specimen has a diameter of almost 15 mm. There was also secured an example of *Vitrea cellaria*, var. *margaritacea* Schmidt, the white variation. As the introduced species of *Vitrea* are not very generally known, a brief table may be of service.

Shell small, about 6 mm. diameter ; shell and animal both quite dark ; in life nearly always with a strong garlic odor.

V. alliaria (Miller).

Shell much larger when mature, and not smelling of garlic.

Shell about 10 mm. diameter, compact, nearly circular in outline, pale brownish or (var. *margaritacea*) white ; animal pale, darker dorsally.

V. cellaria (Müller).

Shell larger when mature, broader, with the last whorl broader and flatter, dark-colored ; animal very dark bluish or bluish slate, the basis of the upper tentacles swollen.

V. lucida (Draparnaud).

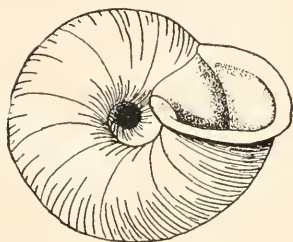
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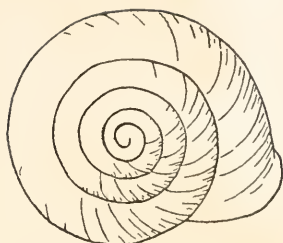
BERMUDA IN PERIODICAL LITERATURE, with occasional references to other works : A Bibliography, by George Watson Cole 1907. Pp. xii+275. " By far the greater part of what has been written concerning Bermuda has appeared in various periodicals and the publications of learned societies. These writings may roughly be divided into historical and descriptive, and those relating to natural history. Of history, properly speaking, little has appeared ; but many descriptive articles have been written by tourists and others who have visited those beautiful islands. Their geographical situation and subtropical fauna and flora early attracted the attention of those interested in scientific phenomena. Soon after beginning this work it became apparent to the compiler that the Bermudas have for the past half-century been a favorite field of the zoölogist, botanist and geologist. Bearing this in mind, a special effort has been made to render the record of their labors as complete as possible. In order to do this, references are made to some works which are not periodicals, mostly, however, by authors who have also made contributions to periodical literature concerning the flora and fauna of those islands."

The scope of this work is sufficiently indicated in the above quotation from the author's preface. Mr. Cole has made the bibliography of Bermuda a labor of love for many years, and the number of titles brought together here will surprise even those who have been interested in things Bermudian. The notes given under all important titles amount to a digest of the papers. Thus in dealing with biological articles, all species described from Bermuda are cited, and extracts are given to show what of interest any paper contains. To the naturalist interested in Bermuda the work will take its place as an indispensable reference book ; but Mr. Cole's delightful notes give the opus a merit all its own ; it is really a *readable* bibliography.

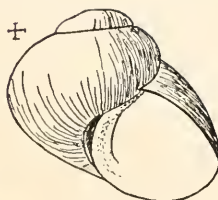
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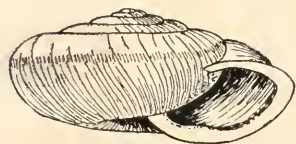
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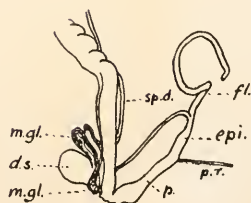
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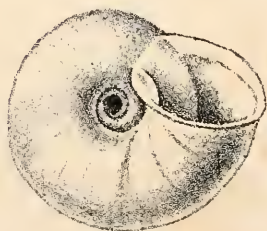
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THE NAUTILUS.

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No. 12.

NOTES ON PLATE XI.

Several references to the figures grouped on this plate were published before the plate was made up, and require correction in the text.

Figs. 1, 2, 3, *Polygyra martensiana* Pils., Tampico, Mexico. Described in the July number, p. 26. The dimensions are wrongly given in the text. The type measures, alt. 5.5, diam. 11 mm., another specimen, alt. 4.8, diam. 8.8 mm.

Fig. 4, *Flumicola minutissima* Pils. Idaho. Description in November number, p. 76. Alt. 1.5 mm.

Fig. 5, *Vertigo occidentalis* Sterki. Bluff Lake, San Bernardino Co., California. Described on p. 90. In our opinion this form should be ranked as a subspecies under *V. modesta* nearest to *V. modesta castanea* St., from which it differs in the shorter, wider, less cylindric shape, and the slightly larger teeth. If this view is correct it will stand, as *V. modesta occidentalis*, among several other slightly differentiated races of *modesta*, all variable, and especially developed in the Canadian zone of the Rocky Mountains.¹ *V. m. occidentalis* is illustrated from the unique type, by courtesy of Mr. S. S. Berry. It is No. 1860 of his collection. See also p. 123.

Figs. 6-10, *Micrarionta desertorum* Pils. & Ferr. Described on p. 134. H. A. P.

¹See in this connection the figures in Pilsbry and Vanatta, Partial Revision of the American Pupæ, 1900, p. 600, pl. 23.

A NEW MICRARIONTA FROM ARIZONA.

BY H. A. PILSBRY AND J. H. FERRISS.

When at the Grand Canyon of the Colorado in the autumn of 1906 the writers met Mr. W. J. Gilchrist, who at that time was about to leave the Canyon for the mining region of the lower Colorado. Besides various friendly and helpful services in connection with our work at the Canyon, Mr. Gilchrist volunteered to look out for snails in the region he was about to visit. It was with a great deal of pleasure that one of us received a letter and package of snails, making good his offer of assistance.

In that desert country snails are not common, and for a long time none were found. Finally, Mr. Gilchrist writes, "I was building a stone monument on a mining claim just after a heavy rain and found three live snails on a rock. These and four dead ones were all I have been able to find. They came from a small range of mountains 12 miles south from Parker, Yuma Co., Arizona."

The snails prove to be of a new species, which may be described as follows.

MICRARIONTA DESERTORUM n. sp. Plate xi, figs. 6-10.

The shell is small, depressed, openly umbilicate, the width of umbilicus contained nearly 5 times in that of the shell, glossy, opaque, pinkish-white with some oblique streaks of flesh-color, and sometimes a few corneous dots; the inner $2\frac{1}{2}$ whorls fleshy-corneous. The spire is convex but very low, whorls about $4\frac{1}{3}$, the inner ones rather slowly increasing, the last much wider, about double the width of the preceding. The embryonic shell consists of $1\frac{1}{2}$ whorls, the first fourth of a whorl smooth, the rest with close, even sculpture of minute papillæ, which are lengthened in a direction parallel to the sutures, and form a regular pattern of oblique, forwardly descending and ascending rows. The post-embryonic whorls have fine, irregular, somewhat wavy striæ in the direction of growth-lines, and papillæ like those of the embryonic whorls but much more sparsely placed, and disappearing near the end of the penultimate whorl. The last whorl has weak growth-lines only. It is rounded peripherally and descends slowly to the aperture. The suture is deeply impressed, especially at the last whorl. The aperture is oblique, rounded-oval.

Peristome slightly expanded, with a narrow, rusty edge; upper and outer margins very slightly expanded; basal margin more expanded; columellar margin rather broadly dilated. The ends converge and are joined by a short glossy callus.

Alt. 7.5, diam. 12.9, aperture alt. 5.8, width 6.7 mm.

Alt. 6.8, diam. 11.6 mm.

Alt. 6.7, diam. 11.1 mm.

The whole upper surface, head and tentacles, are blackish-slate color, finely irregularly granulose. There are no distinct dorsal or genital furrows. The sole is tripartite, the areas separated by indistinct longitudinal impressed lines, in drowned alcoholic examples. The middle area is twice as wide as the others, slaty-white; side areas darker slate color. The mantle is whitish, the venation of the lung outlined delicately with gray.

The genital system (pl. XI, fig. 9) resembles that of *M. hutsoni*. The penis (*p.*) is swollen near the base, and has a slender retractor muscle (*p. r.*), and a moderately long flagellum. The vagina is very short, the spermatheca globular, its duct very long, and inserted unusually low, much farther down than in *M. hutsoni*. The dart sack (*d. s.*) is large, and near its base, on the side facing the vagina, the two mucus glands (*m. gl.*) are inserted close together (as shown in fig. 10, a diagrammatic view of these organs). The mucus glands descend and their enlarged ends lie near the base of the dart sack. The measurements are: length of penis (to insertion of retractor), 3 mm.; length of epiphallus, 1.8 mm.; length of flagellum, 4 mm.; length of vagina, 1.8 mm. The jaw has about 6 unequal ribs, grouped in its median part.

This species is doubtless related to both *Sonorella baileyi* and *S. fisheri* Bartsch, both of which differ in various details of sculpture. It stands nearest to *Micrarionta hutsoni* Clapp, having the same type of embryonic sculpture; but that species has a dark band above the periphery, bordered with white above, and a much larger aperture.

Cotypes are in the collections of Ferriss and the Academy of Natural Sciences (No. 94783).

The anatomical data obtained from living examples of the species *hutsoni* and *desertorum* by the junior author, indicate that we went too far in referring species from the lower Colorado basin to the genus *Sonorella*. It now seems likely that the species *wolcottiana*, *indioensis*, *baileyi*, *fisheri*, *lohrii*, and perhaps some others, belong to

Micrarionta; a group which should apparently be given generic rank. Anatomically, *Sonorella* is not closely related to the *Micrarionta* series, which has its center in southern and Lower California, and the adjacent border of Arizona. Data to be presented in our forthcoming report on southwestern snails collected in 1906 and 1907 indicate that *Sonorella*, while remarkably varied in anatomy specifically, yet shows no forms in any way connecting with the Californian types of *Helices*.

EXPLANATION OF FIGURES.

Plate XI, figs. 6, 7, 8. *M. desertorum*.

Fig. 9, genitalia of the same specimen; *d. s.*, dart sack; *epi.*, epiphallus; *fl.*, flagellum; *m. gl.*, mucus glands; *p.*, penis; *sp. d.*, lower portion of the duct of the spermatheca. The mucous glands and their ducts are shaded.

Fig. 10. Diagram of dart sack and mucous glands viewed from the side towards the vagina, showing the contiguous insertions of the mucous ducts.

SOME NEW CALIFORNIAN SHELLS.

BY WILLIAM HEALEY DALL.

RISSEO (ALVANIA) GRIPPIANA Dall, n. sp.

Shell small, brownish, solid, cancellate, with one and a half smooth nuclear and five and a half sculptured whorls, nucleus flattish, blunt, remaining whorls rotund, evenly enlarging; last whorl with 13-14 axial ribs crossed by somewhat more slender, equal, equidistant, spiral threads not tuberculate at the intersections, with three somewhat stouter spirals on the base; earlier whorls with two and then three spiral threads between the sutures; suture indistinct, aperture obovate, rounded in front, slightly angular behind, with a much thickened lip which in senile specimens is duplex at the margin. There is a very minute chink but no umbilicus. Length 3, max. diam. 1.5 mm.

Type specimens from Todos Santos Bay, Lower California, between tides, Hemphill, U. S. Nat. Mus. 46171; others from 12 fathoms sand, off the entrance to San Diego harbor, C. W. Gripp;

others at various localities north to San Pedro and Catalina Island, California, mostly beach specimens. The species recalls *R. tumida* Carpenter, but is much more elevated, though less so than *R. incurvata* Cpr., which is also a thinner shell. All three have very nearly identical sculpture.

BELA GRIPPI Dall, n. sp.

Shell small, straw-color or pale brown with occasional spiral bands of darker brown, or all brown; six-whorled, of which the first whorl and a half are white, polished, smooth and turgid, the subsequent portion of the shell having a dull surface; earlier whorls with the periphery nearer the anterior suture, the whorl behind the periphery somewhat flattened and compressed, crossed by low obscure riblets; about a dozen on the fourth whorl, which become obsolete later; the whorl in front of the periphery shows no axial sculpture; the whole whorl is spirally sculptured with narrow sharp incised lines, one dividing the space behind the periphery, and about five in front of the periphery on the penultimate whorl; on the last whorl between the periphery and the siphonal fasciole there are about twelve of these lines, though they probably vary in number with the individual, while the incremental lines are moderately conspicuous; outer lips thin, simple; pillar lips with a small deposit of white callus; aperture narrow, lunate; canal very short, wide, with an inconspicuous fasciole. Length 9, of spire 5, of aperture 4; max. diam. 3.5 mm.

Dredged off San Diego Bay, about five miles south of the entrance in fifteen fathoms, by C. W. Gripp, on a bottom of broken shell. This is a very well marked species, hardly to be compared with any other known from the coast. Seven specimens were obtained of which two are in Mr. Gripp's collection.

The shell has much the aspect of an *Anachis* but one specimen retained the dried animal and by carefully soaking it out it proved to be a Plenrotomoid, with a short oval operculum with apical nucleus like that of *Bela*, though the shell from the absence of the strong axial ribs characteristic of most of the northern *Belas* has a very different aspect from the familiar forms of that genus. The animal is white, with short acute tentacles and very small black eyes.

NEW SPECIES OF ANCYLIDÆ.

BY BRYANT WALKER.

ANCYLUS (FERRISSIA) HENDERSONI n. sp. Pl. ix, figs. 8-10.

Shell small, thin, delicate, oval, slightly wider anteriorly, right side nearly straight, left side regularly curved; obtusely elevated; light horn-colored, apex very obtuse, depressed, not projecting above the normal outline of the shell, and only slightly deflected toward the right; apical pit in the centre and looking upwards; apical striæ strong and regular, originating from the circumference of the apical pit and projecting down towards the whole upper surface of the shell, becoming lighter and more irregular below, comparatively few reaching the edge of the shell; lines of growth irregular, but rather strong, giving a reticulated appearance to the surface where they cross the radial striæ; anterior slope, especially above, very convex, the highest point of the shell being in front of the apex; posterior slope slightly concave, nearly straight; left lateral slope convex, right slope nearly straight.

Length 2.5, width 1.5, alt. .75 mm.

Type (No. 25707 Coll. Walker) from Lake Waccamaw, N. C. Cotypes in the collections of Messrs. Jno. B. Henderson, Jr., and G. W. H. Soelner, of Washington, D. C. This small species was found by Messrs. Henderson and Soelner in the pools of the swampy woods around the shore of Lake Waccamaw in the fall of 1906.

It is well characterized by its obtusely elevated shape, blunt apex and radiating ribs or striæ. In sculpture it resembles *A. borealis* Mse., but differs from its thin, delicate shell, smaller size and different proportions, being relatively less elevated and with a longer and more sloping posterior outline.

ANCYLUS (FERRISSIA) NOVANGLIÆ n. sp. Pl. ix, figs. 5, 6 and 7.

Shell small, depressed, elongate oval, sides nearly parallel, the left being slightly more curved than the right; regularly rounded at the extremities; apex prominent, bluntly rounded, situated on the posterior third, very eccentric, turned decidedly to the right, apical striæ prominent; lines of growth fine and regular; anterior slope long, convex with numerous, fine, radiating ribs, which extend to the periphery; posterior slope oblique, nearly straight below the

swell of the apex; left slope very convex, more or less compressed toward the apex; right slope nearly straight below the protrusion of the apex.

Length 3.25, width 1.75, alt. 1 mm.

Types (No. 22502 Coll. Walker) from a small pond near Cambridge, Mass., collected by Owen Bryant. Cotypes in collections of Mr. Bryant and the Philadelphia Academy.

This little species is easily distinguished by its narrow, elongated, depressed form, very eccentric apex and the costulate anterior slope.

ANCYLUS (FERRISSIA) HINKLEYI, n. sp. Pl. ix, figs. 11-13.

Shell oval, slightly wider anteriorly, sides equally curved, elevated, conic; apex nearly central, being only slightly behind the longitudinal center and very slightly deflected toward the right, acute, erect, with strong radial striæ; light greenish horn color with the apex bright rose color; anterior slope slightly convex, posterior slope slightly concave, lateral slopes of about the same slight convexity; surface smooth, lines of growth fine, but irregular, no trace of ribs or radial striæ, except at the apex. Length 4.75, width 3.5, alt. 2.25 mm.

Type (25661 Coll. Walker) from the Ohio River at Golconda, Ill. Cotypes in the collection of A. A. Hinkley, DuBois, Ill. Also from the Ohio at Elizabethtown, Ill. (Coll. Hinkley), and from Kentucky. (Coll. Am. Mus. Nat. Hist.).

Four specimens were submitted for examination by Mr. Hinkley from the above localities. In two of the specimens, in which the apices are not at all eroded, the truncation is oblique, the apical pit opening towards the left. The right margin of the truncation is high and smooth, the apical striæ beginning just below the smooth border of the truncation. On the left and lower margin of the pit the apical striæ radiate from the center. *A. hinkleyi* by reason of its rosy apex groups, apparently, with *A. elatior*, *filosus* and *rhodacme*. Unfortunately the shells had been cleaned, so that at present it is impossible to say whether it shares the anatomical peculiarities common to those forms.¹

It differs from *elatior* by its smaller size, acute, erect apex and

¹These species and probably all the pink-tipped *Ancyli* have a very peculiar lingual dentition, quite different from any of the other *Ancyli* and form a group of probably generic rank, a full description of which will be published shortly.

concave posterior slope. It stands nearest to *A. filusus* from which it differs by the nearly central, acute apex, proportionately longer and concave posterior and less convex anterior slope and smooth surface. It is so entirely different in shape from *rhodacme* that there is no danger of confounding them.

The two specimens from Kentucky, received by the Am. Mus. of Nat. Hist. from Anthony as *A. elatior* are apparently identical with this species (see NAUT. XVIII, p. 79).

ANCYLUS (LÆVAPEX) HEMISPHERICUS n. sp. Pl. ix, figs. 14, 15 and 16.

Shell obtusely elevated, broadly oval or subcircular, sides almost equally rounded; apex subcentral, very obtuse and only slightly inclined toward the right; smooth, light yellowish horn color; anterior slope very convex, posterior somewhat less so; lateral slopes about equally convex, the left being as usual, somewhat the longer; lines of growth rather prominent and irregular, more or less rippled by subobsolete, irregular radial striæ.

Length (type) 3.5, width 3, alt. 1.5 mm.

Length (cotype) 3.8, width 3.1, alt. 1.8 mm.

Length (Decatur) 4.1, width 3.25, alt. 1.8 mm.

Types (No. 20785 Coll. Walker) from Georgia. Cotypes in the collections of the Kent Scientific Museum, Grand Rapids, Mich., and the Philadelphia Academy. Also from Decatur, Alabama.

The type lot formed part of the DeCamp collection now in the Kent Scientific Museum. Unfortunately no definite locality is given and no further information as to the history of the specimens is attainable.

This species is very distinct by its globose, almost hemispherical shape. None of the shells have a perfect apex.

The type is not quite full grown, but was selected as being less eroded and showing more exactly the contour of the shell. The other measurements given are from mature shells which show the length and width accurately, but owing to erosion are proportionately less elevated. With the erosion of the apex the anterior and posterior slopes have nearly the same convexity, and the specific name adopted becomes even more appropriate than in the type.

The specimens from Decatur, Ala., also collected by De Camp, are slightly larger and heavier than the types, but evidently the same species.

CLAMS AND THE EARTHQUAKE.

BY ROBERT E. C. STEARNS.

Under the head of "Abalones and the Earthquake," in the April, 1907, number of THE NAUTILUS, my brief article contained all that I had been able to learn up to the preceding February, of the effect of the earthquake of April 18th, 1906, upon the marine life of the coast. The Abalones (*Haliotis*) in the neighborhood of Morro Rock, about 190 miles south of the entrance to San Francisco Bay, were found in abundance, but all dead, and the earthquake it was presumed did the killing. Recently the Indians and the Spanish population about Marshall's and Tomales Bay, who for several years have been engaged in supplying the local "clam" *Paphia staminea* Conr. (*= Tapcs staminea* auct.), for the San Francisco market, have been, it is so reported, thrown out of employment, the bay having become so shallow as to preclude the use of boats, and clam-diggers state that since the great earthquake no clams have been found there. In many instances these toilers of the clam banks have been reduced to poverty.

In and around Tomales Bay which is about fifty miles north of the entrance to the Bay of San Francisco, the quake was far more severe than at the southerly abalone locality mentioned, being in the direct northwesterly line of the main movement. Dr. Gilbert¹ remarks "the only notable water waves generated by the shock were in Tomales Bay where a group of waves estimated to be 6 or 8 feet high, came to the northeastern shore. The mud which forms the bed of the bay, was shifted and ridged and more or less horizontal displacement occurred as well as a marked shallowing of the waters." At Bolinas, which is north of the Golden Gate, and about thirty miles south of the Tomales locality, the shore of the lagoon or little inner bay, the home, when I was there in June, 1866, of *Tresus nuttalli* Conrad (*Schizothærus nuttalli* of Carpenter), was cracked, and the mud near the head of the lagoon was disturbed as well as the general region thereabout according to Mr. Gilbert. The "little round clam" as the Tomales form is called, is a favorite with many epicures,

¹ Bulletin No. 324. The San Francisco Earthquake, etc., etc., of April 18, 1906. Washington, 1907.

but its tough little foot is not conducive to the happiness of persons of feeble digestion. The fine clam *Tresus* is seldom, if ever, seen on the stalls in the San Francisco markets. It is noble in size and a patrician in quality, and makes a most delicious soup or chowder.

Los Angeles, Cal., March 8, 1908.

THE MOLLUSCA OF NORTH HAVEN, MAINE.

BY HENRY JACKSON, JR.

The Fox Islands constitute an archipelago in the mouth of Penobscot River. The largest of these islands is Vinal Haven, and next in size and position is North Haven. On either side are bays ranging from 4 to 8 fathoms in depth, with many varieties of bottom. The land is equally well adapted for shell collecting, except that there are practically no hard-wood trees. It is very peculiar that quite a number of species have one small place in which they are abundant, and they are not to be found elsewhere. The fresh-water shells have a very fair chance; there is a large pond about one mile long which promises large returns in time. There are also several semi-marshy tracts in which many smaller *Limneas* are found. Unfortunately I have not been able to dredge beyond 30 fathoms. So it is to be hoped that more species will soon be turned up.

My sincere thanks are due to Dr. Charles G. Weld, Prof. Edward S. Morse, Mr. Dwight Blaney and Mr. C. W. Johnson, for identification of various mollusks and other acts of kindness.

POLYPLACOPHORA.

<i>Trachydermon ruber</i> , Linné.	<i>Trachydermon albus</i> , Linné.
Common.	Rather common.

PELECYPODA.

<i>Nucula proxima</i> , Say. Very common. Large specimens were found in four fathoms mud.	<i>Yoldia myalis</i> , Couthouy. Rare. A few specimen dredged in eight fathoms water.
<i>Yoldia limatula</i> , Say. Very common. Beautiful specimens over two inches long were obtained.	<i>Yoldia lucida</i> , Lovén. Two specimens dredged in twenty fathoms mud. The eggs were in the shell.

- Yoldia thraciæformis*, Storer. Several old broken valves and an occasional young specimen.
- Anodonta cataracta*, Say.
- Unio complanatus*, Say.
- Pecten magellanicus*, Gmelin.
- Pecten islandicus*, Müller. Rare. Single valves occasionally.
- Anomia simplex*, d'Orbigny.
- Anomia aculeata*, Müller.
- Mytilus edulis*, Linné.
- Modiolaria nigra*, Gray. Rare. Several broken specimens.
- Modiolaria discors*, Linné.
- Crenella glandula*, Totten.
- Crenella decussata*, Montagu. Rare. Same locality as *C. glandula*.
- Periploma fragilis*, Totten.
- Thracia conradi*, Couthouy. Rare.
- Thracia myopsis*, Möller.
- Pandora gouldiana*, Dall.
- Lyonsia hyalina*, Conrad. Common. Sandy mud, ten fathoms.
- Lyonsia arenosa*, Möller. Extremely rare. Same localities as *L. hyalina*.
- Cyclas islandica*, Linné.
- Astarte undata*, Gould.
- Astarte subaequilatera*, Sowerby.
- Pisidium abditum*, Hald.
- Sphaerium partumeium*, Say.
- Venericardia novangliæ*, Morse. Rare.
- Venericardia borealis*, Conrad.
- Thyasira gouldii*, Philippi.
- Cardium pinnulatum*, Conrad.
- Cardium ciliatum*, Fabricius. Rare.
- Callocardia morrhuana*, Linsley. Rare.
- Macoma balthica*, Linné.
- Macoma calcarea*, Gmelin.
- Mya arenaria*, Linn.
- Saxicava arctica*, Linn.
- Lymnæa humilis*, Say.
- Lymnæa umbilicata*, Adams.
- Lymnæa desidiosa*, Say.
- Lymnæa columella*, Say.

SCAPHOPODA.

Dentalium entalis, Linné. Common in deep water, mud.

GASTROPODA.

- Acmaea alveus*, Conrad. Very common on *Zostera marina*.
- Acmaea testudinalis*, Müller. Rarer than *alveus*.
- Lepeta cæca*, Müller.
- Puncturella noachina*, Linn.
- Margarita helicina*, Fabr.
- Margarita groenlandica*, Gmelin. Very rare.
- Natica clausa*, Broderip & Sowerby. Rather rare.
- Lunatia heros*, Say.
- Lunatia heros*, var. *triseriata*, Say. Very common. Found both in deep and shallow water, but never in company with *Lunatia heros*.
- Velutina lævigata*, Linn.

- Velutina zonata*, Gould. Rarer than *V. lævigata*.
Crucibulum striatum, Say. Rare alive. Common dead.
Littorina littorea, Linn.
Littorina rudis, Donovan.
Littorina palliata, Say.
Lacuna vineta, Montagu, on *Zostera marina*.
Lacuna vineta, var. *fusca*. On large *Laminaria*.
Cingula aculeus, Gould. Common at base of *fucus*.
Cingula carinata, Mighels & Adams. Rare. A few specimens in sandy mud, ten fathoms.
Skenea planorbis, Fabricius.
Amnicola limosa, Say.
Trichotropis borealis, Broderip & Sowerby.
- Purpura lapillus*, Linn. Very abundant; var. *imbricata* is also common.
Buccinum undatum, Linn.
Chrysodomus decemcostatus, Say. Rather uncommon.
Tritonofusus stimpsoni, Mörch. Rare.
Tritonofusus pygmæus, Stimpson.
Nassa trivittata, Say.
Nassa obsoleta, Say.
Columbella rosacea, Gould. Rare.
Bela incisula, Verrill.
Bela nobilis, Möller. One specimen.
Bela harpularia, Couthouy.
Bela decussata, Couthouy. Rare, in company with *B. incisula*.
Retusa gouldii, Couthouy. Rare.
Retusa pertenuis, Mighels.
Cylichna alba, Brown.

PULMONIFERA.

- Zoögenites harpa*, Morse. Very common.
Vallonia pulchella, Müller.
Polygyra fraterna, Say.
Strobilops labyrinthica, Say.
Bifidaria pentodon, Say.
Pupilla muscorum, Linné.
Vertigo gouldii, Binney.
Cochlicopa lubrica, Müller.
Vitrea indentata, Say. One immature specimen.
Vitrea hammonis, Ström.
Zonitoides arborea, Say.
- Pyramidula alternata*, Say.
Pyramidula cronkhitei anthonyi, Pilsbry.
Zonitoides exiguus, Stimpson.
Zonitoides minuscula, Binney. Extremely rare.
Carychium exiguum, Say.
Helicodiscus pallelus, Say.
Aplexa hypnorum, Linn.
Succinea retusa, Lea.
Succinea avara, Say.
Succinea ovalis var. *totteniana*, Lea.

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